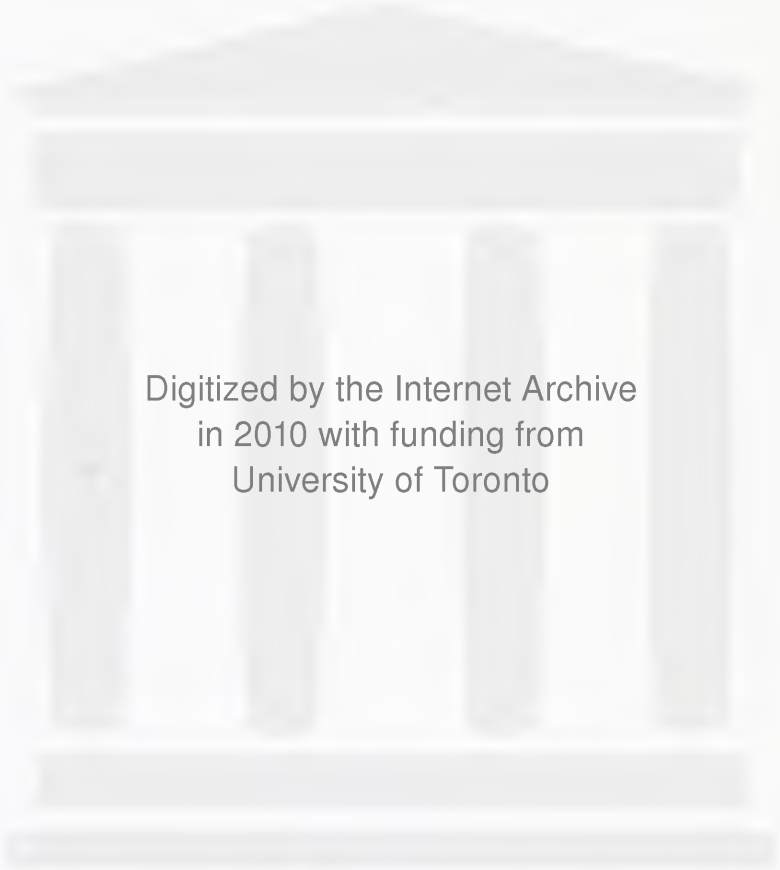

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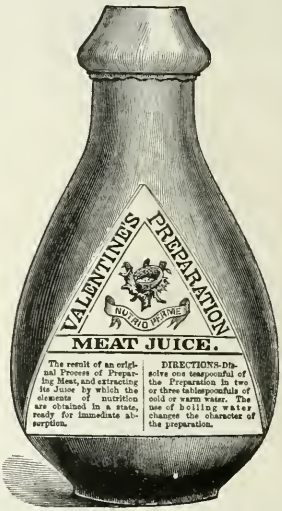
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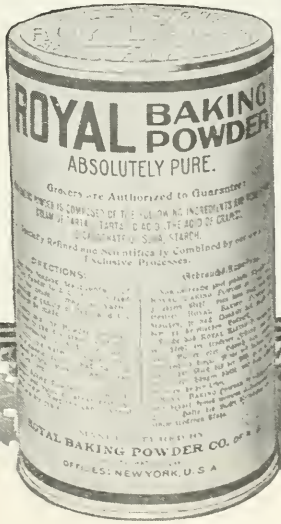

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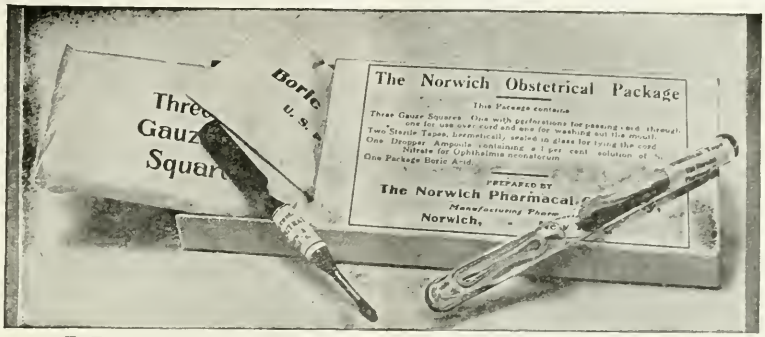

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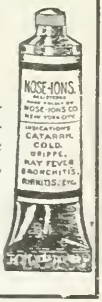

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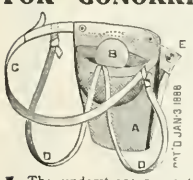

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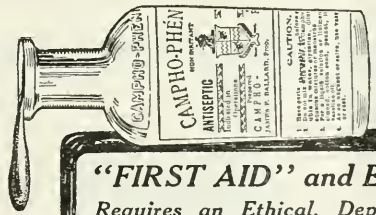

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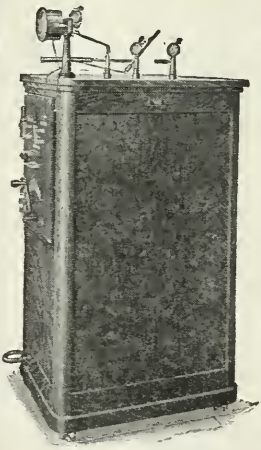

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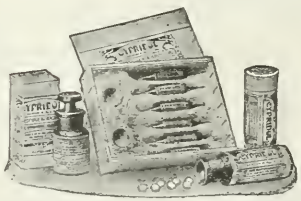

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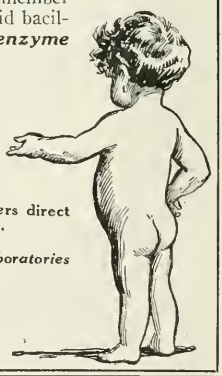

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Original Communications

X RAY DIAGNOSIS IN DISEASES OF THE CHEST.*

BY GEORGE E. PFAHLER, M. D.,

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Professor of Röntgenology, Medico-Chirurgical College of Philadelphia.

The value of the x-rays in diagnosis of diseases of the chest has been definitely established and is being almost universally recognized. The x ray will give evidence of disease within the chest, 1, whenever there is any change in contour of the chest as a whole or any part of the chest; 2, when there is any change in density of any portion of the chest, or any change in density of any organs within the chest; 3, when there is any change in the movements of the organs within the chest.

In studying the heart, the aorta, the diaphragm, or the lung tissue, the value of evidence will depend upon the skill of the operator in producing good plates or in obtaining good fluoroscopic images upon the screen, and of by far greater importance will be the skill with which the abnormalities are interpreted. With regard to interpretation, one should have a knowledge of all the possible macroscopical pathological changes which may affect the chest as a whole or any organ within the chest. Therefore, the more the röntgenologist knows of pathology the more skillful is he likely to be in the interpretation of the evidence at hand. One should also have a thorough knowledge of the history and progress of the various diseases affecting the organs within or about the chest so that the proper value can be placed upon the evidence at hand according to the probable stage of development in any particular disease. Therefore, the more the röntgenologist knows of the diseases of the chest in general, their history, and their favorite location, the more valuable will be the evidence obtained by the Röntgen rays. While I believe that the most valuable and most definite evidence of disease can be obtained by the Röntgen rays, it should not be considered as an isolated diagnostic point, but should be measured in conjunction with the history, physical signs, and the progress of the disease in every individual case. Inconsistency or contradiction in evidence must be considered most carefully and as far as possible be eliminated before arriving at a final diagnosis. Inconsistencies and contradictions usually mean ignorance in some respect, and a frank acknowledgment of this fact to oneself will often lead to increased effort, further study, and a proper diagnosis. I have observed that very generally mistakes in diagnosis are not so much the result of ignorance as of insufficient work or carelessness. In this very brief paper it will be impossible to present any phase of this subject exhaustively. I present merely a résumé of facts as observed by röntgenologists.

Pulmonary tuberculosis.—Probably the most frequent use of, and the most valuable evidence of disease within the chest is obtained in the study of tuberculosis. Tuberculosis can be recognized as early as there are tissue changes which will produce some variation in the degree of density of the lung. The early x ray evidence is obtained only upon plates, and these plates should be made stereoscopically, preferably a pair of stereoscopic plates made anteriorly and a pair posteriorly. Added to this there should be a special plate made of the apices of the lungs eight by ten inches in size, the rays being sent obliquely downward in line with the chin so as to project the clavicles downward and clear the apices of the lungs. The evidence of disease about the apices of the lungs can be further demonstrated more clearly if one instructs the patient to exhale forcibly against resistance, i. e., an ordinary deep breath forced against the lips and palate without allowing any air to escape distends the apices of the lungs. This can be seen fluoroscopically in a healthy individual. In the respiratory act during inspiration and full retention of this inspiration the lower portion of the lung becomes greatly distended, but the apices are less distended. During exhalation, however, under normal conditions, the apices of the lungs become distended with air and become beautifully illuminated. When one studies good stereoscopic plates showing a great amount of detail under favorable conditions, the evidence of early tuberculosis will consist in the minute deposit of tubercles at the points which pathologists have long determined to be the most frequent. While conditions vary and while there are exceptions to all rules, one finds this evidence most frequently at the apices and particularly the inner portion of the apices of the lungs extending down along the vertebral border. This evidence may occupy also the apices of the lower lobe or the outer portion of the

*Read before the American Climatological and Clinical Association, at Lakewood, May 31, 1917.

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middle lobe in adults, while in children the disease seems to extend most frequently outward from the roots of the lungs.

Tuberculosis in children is best studied by means of good intensifying screens upon plates because of the difficulty in getting the patient to remain quiet even for an instant. Intensifying screens and a soft tube will give much detail with very short exposures. A tenth to a twentieth of a second exposure in very young children will usually be sufficient. In looking for early tuberculosis in adults it is well to keep in mind the fan shaped arrangement upon which Dunham lays so much stress. In this fan shaped arrangement the disease is seen in the distribution of the terminal bronchi. One must not lay too much stress upon this arrangement, for when it is present it is of value and should be looked for, but it may not always be presented with the flat side toward the eye, and one may see the grouping on edge. If one keeps in mind simply the terminal branches of the bronchi and looks for the lesion in such an arrangement, one can often make the diagnosis early. This evidence, of course, should not be taken as an isolated factor, but in conjunction with the physical signs. In many instances it will make a doubtful diagnosis positive, or may be the means of eliminating tuberculosis. Advanced tuberculosis can always be recognized and it can be recognized by all methods of diagnosis. In fact very commonly the patient brings the diagnosis to the physician. Extensive consolidation and cavity formation can be demonstrated clearly on plates or can be seen fluoroscopically. The extension of the disease from the apices downward toward the base of the lungs should always suggest tuberculosis and the diagnosis should be definitely proved negative before given up. The infiltration which is so frequently found extending into the lower lobe from the lower bronchial tree is, I believe, very rarely tuberculosis, but is found commonly in chronic bronchitis. It is usually secondary to dust infection. Bronchiectasis must be considered in these conditions especially.

The three diseases which are the most difficult for me to differentiate from early tuberculosis are metastatic carcinoma, leucemia, and syphilis. For the differentiation of these conditions one must often study very carefully the history and progression of the disease, for it is entirely possible for any of these three diseases to be associated with tuberculosis. There are, however, differentiations which are of some value.

Metastatic carcinoma.—The history of previous carcinoma, particularly when it has involved the breast, will be of considerable value. The disease itself may often be distributed through the lungs in almost an identical manner. A general diffused infiltration by carcinomatous nodules may be present and may give almost identical evidence with the general or disseminated tuberculosis, or it may occupy only the apices of the lungs as in tuberculosis. Generally, however, the disease spreads outward from the roots of the lungs or the mediastinum. It may, however, occupy any portion of the lungs and extend from this central source. There is this slight difference: in metastatic carcinoma the disease develops from some point and gradually invades the surrounding tissue by direct extension, presenting, I believe, a more uniform appearance than in the tuberculosis—in other words, a less mottled appearance. For instance, if disease begins in the apices there is at the time an increased density very gradually shading into the surrounding tisues, and if the disease is followed over a few months the progression can be observed very positively and the increase in density both in the original portion as well as in the extension outward. There is very rarely, if ever, cavity formation and the disease in more generally associated with pain.

Leucemia.—Leucemia presents a general mottling very similar to that of tuberculosis, but it is more apt to be a general affection of the lungs. This differential diagnosis may seem unimportant to the average physician, however. During the past year I had a patient who had been confined for six months in a tuberculosis sanitarium because she had a persistent cough, a moderate degree of anemia, and physical signs suggesting tuberculosis of the lungs. A blood count had been made, but the differential count had been omitted. The chest had been examined but a very large spleen and the abdomen had not been palpated. This showed great carelessness, as in most mistakes in diagnosis.

Syphilis of the lungs.—This is, I believe, rare. It does occur, however, and there are physical signs and symptoms similar to tuberculosis. Röntgenographically the appearance of the lungs may resemble tuberculosis very closely. Here again, however, the involvement of the lungs is more apt to be of a general character, or to extend outward from the roots of the lungs rather than to involve the apices of the lungs or the apices of the lobe and extend downward.

Bronchiectasis must also be differentiated from tuberculosis. In its classical form the diagnosis is easy, but many cases occur in which the symptoms are in no sense those of the classical type. When the cavity or cavities are large and when large quantities of sputum are expectorated, which the student is taught to expect, the diagnosis is simple, but there are a large number of patients who have a persistent cough, a moderate degree of emaciation, and considerable expectoration and in whom none of these classical symptoms are present. They represent the type in which there are many very minute bronchial dilations, as can be shown by stereoscopic observation. They give physical signs very similar to tuberculosis, but röntgenographically the disease is distributed more especially in the base of the lungs and above the lower bronchial trees, though it may involve even the upper bronchi.

Bronchopneumonia cannot always be differentiated from tuberculosis. This is especially true in children in whom there may be the same onset, the same general symptoms and practically the same character of Röntgen findings. In most cases the disease extends outward from the roots of the lungs. It has seemed to me, however, that upon careful study of the plates there seems to be a tendency in the tuberculous variety to extension up-

ward about the upper bronchial tree, while in the other form of bronchopneumonia the disease tends to extend outward and downward from the roots of the lungs. In adults the bronchopneumonic type of tuberculosis is less common and the possibilities, therefore, are in favor of an infectious bronchopneumonia rather than tuberculosis when the disease can be clearly demonstrated as extending from the roots of the lungs outward.

Lobar pneumonia.—The physical evidence of lobar pneumonia is clear, and generally Röntgen evidence is not called for. Occasionally, however, the symptoms and physical signs are obscure. Studied röntgenologically lobar pneumonia occupies usually one of the lobes of the lungs, sometimes two or more. Rarely is it confined entirely to the lobe, and very commonly there is not total consolidation. It is probably this that leads to obscure physical signs. When there is much consolidation about the root of the lung with a peripheral compensatory emphysema the physical signs would naturally be obscure, and in such instances a Röntgen study will be of the greatest value. The Röntgen rays will also be of value in studying the patient during convalescence. It usually requires a considerable time, sometimes weeks or a month, for the lungs to clear up completely after a lobar pneumonia, and, as is well known, such an affection may be associated with tuberculosis or may pass imperceptibly into tuberculosis which is probably because there has been a previous infection by tuberculosis and the superadded pneumonia breaks down the resistance sufficient for the disease to develop.

Tumors of the lungs.—Practically all tumors of the lungs are secondary, and therefore a history of previous involvement of some other portion of the body by tumor tissue can generally be obtained. However, primary carcinoma of the lungs may occur. I have had the oportunity of studying and treating one such case. The Röntgen evidence showed a small area of consolidation extending outward from the roots of the lungs. The diagnosis was definitely made by the patient, a physician, coughing up a portion of the tissue which was examined microscopically. This area disappeared under x ray treatment. In the study of tumors of the lungs there is generally a previous history of the removal of malignant disease, but very often there is a vague history of the removal from some other portion of the body of a tumor which was perhaps considered benign, or the diagnosis of which was uncertain. Therefore, one must not hastily jump at conclusions as to the diagnosis of metastatic disease of the lung.

Metastatic sarcoma.—In my experience sarcoma is a frequent occurrence in the lung tissue secondarily, when sarcoma has been present in some other part of the body. It gives characteristically sharply defined nodules scattered through the lungs. The patient may even have no pulmonary symptoms or only a very slight cough. I have found extensive involvement of the lungs when there were absolutely no pulmonary symptoms, and it is my practice when there is a history of sarcoma and perhaps a recurrence, always to examine the lungs for metastasis. Very frequently the disease will be found. I have never seen metastatic carcinoma present lesions that were so sharply defined.. Very generally the carcinomatous involvement of the lungs extends by the gradual infiltration, and when it occurs as isolated deposits, surrounded by healthy lung tissue, there is still this general fuzzy extension.

Acute pleurisy can probably not be diagnosed by the Röntgen rays excepting in so far as it can be seen to limit the motion of the portion of the chest involved, particularly as it affects the movements of the diaphragm of the affected side. Chronic pleurisy is very generally associated with adhesions. It will, therefore, when it involves the diaphragm, give characteristic interference with movement of the diaphragm and at each point of adhesion of the diaphragm a limitation of the movement. Sometimes this gives the diaphragm a puckered appearance at a number of points. If the pleura is greatly thickened, no matter what area is involved, it will also give some decrease in the transparency as compared with the surrounding areas of the lungs. If it is of the tuberculous variety, which is very common and occupies the apices of the lungs, there is very frequently associated tuberculosis of the lungs. Here there is a general opacity or indefiniteness in outline which very frequently involves the apices of the lungs. Pleuritic effusions should always be examined with the patient in the upright position. In the recumbent posture there is little or no evidence unless the effusion is very great. When the patient is examined in the upright position with pleural effusions, an upper level of increased opacity can be recognized. This is not great and is usually not sufficient to obliterate lung detail, but a distinct line of demarcation can be recognized between the clear lung tissue and the effusion below. This line is never level in the sense that one obtains a level of water in a basin, but is curved, usually outward and upward. This evidence is obscure when there is associated disease of the lung, and is not recognized therefore in an early stage. In advanced pleural effusion there may be considerable compression of the lungs and then the disease is more clearly recognized. The character of the fluid can rarely be differentiated by the Röntgen rays. In a general way empyema gives a slightly greater increase in density, but this is not sufficiently valuable to be seriously considered.

Encysted pleural effusions or *encysted empyema.*—For the diagnosis of this condition the Röntgen studies are of great value, and in this one should make both a fluoroscopic and a röntgenological study. Appearances in this condition are usually very characteristic. There is a dense area surrounded by clear lung tissue and the lines are sharply defined. In this respect the disease differs from abscess of the lungs.

Abscess of the lungs.—In the early stage abscess of the lung will present simply a localized area of consolidation shading gradually into the surrounding tissues. After necrosis of the centre and evacuation of a portion of the abscess have occurred, a cavity surrounded by consolidation progressively shading into the surrounding tissue will be observed. This abscess may be pyogenic in origin or it may be tuberculous. If tuberculous, the other evidences

of tuberculosis previously referred to will be associated. If pyogenic, the disease is likely to occupy the central portion of the lung or the base of the lung. For this purpose the Röntgen rays will also be of considerable value in locating the abscess definitely before surgical intervention, if considered desirable. It has been my observation that when an abscess heals spontaneously the diaphragm on the affected side rises progressively, permitting the cavity to close, and then, after healing is complete, there is a gradual increase in the movements of the lung and diaphragm until it becomes quite transparent again.

Gangrene of the lung, I believe, differs in no respect röntgenologically from abscess of the lung, and the real differentiation consists in the use of the olfactory sense by the röntgenologist or attending physician.

In the study of the heart one observes the size, position, shape, and peristaltic contractions, and the variation of these will often give valuable evidence for diagnosis. The size of the heart will, of course, vary with the individual and no definite standard of the size of the heart can be set. It will vary just as the size of any other organ of the body will vary, whether it be the stomach, the nose, or the little finger. The size will vary not only with the individual, according to birth, but also according to the occupation and the use to which he has put his heart and body, so that the mere record of the size of the heart without due consideration of all other factors is of little significance. Therefore, extensive use of the orthodiagraph has never appealed to me. When there is considerable variation in size one can recognize and interpret the plates with their proper value. The size of the heart can be accurately determined by means of teleoröntgenography, which consists in photographing the heart at a distance of about six feet or two metres. This gives almost the exact size of the heart, there being practically no distortion. Such a record is infinitely more accurate than any that can be obtained by percussion or "physical diagnosis." In fact, I believe that by percussion one cannot determine the size of the heart, as a rule, more accurately than within a half an inch. This statement will startle those who have not had actual experience with expert diagnosticians measured up against photographic records.

The position of the heart is also variable and will vary with every movement of the diaphragm. When the diaphragm is high, either from forced exhalation or from distention of the abdomen by tumor, fluid, or gas, the heart will occupy the highest position and the apex of the heart will be projected upward toward the left side of the chest. In other words, the heart will assume a more nearly transverse position. During forced inspiration, on the other hand, the heart will assume a more nearly vertical position. In addition to this, in most movements there is more or less rotation. Therefore, in interpreting the size and position of the heart one must take into consideration the position of the diaphragm and the associated abdominal conditions.

The shape or outline of the heart is of the greatest diagnostic value. Hypertrophy or dilatation in the region of any of the cavities of the heart can be recognized. In hypertrophy of the left ventricle there is distinct projection to the left and distinct enlargement in the region of the left ventricle. With general dilatation, on the other hand, the heart changes from its pear shape to a more or less globular form, and variation between these two extremes can be recognized definitely. Proper interpretations will be of considerable value in the ultimate diagnosis.

The peristaltic movements are perhaps of even greater value, and these must be observed fluoroscopically or upon the screen. There is a striking difference between the strong, steady contraction of the healthy individual as compared with the rapid, flabby, and more or less general wavy pulsation associated with general dilatation. The study of these various points with reference to the heart is ultimately of considerable value not only in arriving at a diagnosis, but in estimating the progress of the disease either toward recovery or toward ultimate death.

Pericardial effusion.—This can be recognized and often diagnosed by means of the Röntgen rays. In this one finds, as would be expected, a more or less triangular sac with a base at the bottom. The general shape of the heart and pericardium is a large triangle, and if the effusion is great there may be a total absence of the peristalsis, or if not great the peristaltic wave is definitely diffused or made less distinct.

The study of the great vessels is of much value. By making use of the oblique position a general atheroma or localized plates within the aorta can be recognized very early. This condition is commonly associated with angina pectoris, so that when a patient has anginoid pains it is worth while to make such a study and establish the diagnosis more definitely.

Aneurysm is recognized by the tumor formation along the course of the aorta presenting expansile pulsation. These are the essential characteristics.

Mediastinal tumors may occupy a similar position. They present no expansile pulsation, though they may present some transmitted pulsation. If the mediastinal tumors are multiple, such as commonly occurs with Hodgkins's disease or other glandular conditions, one can very easily differentiate it from aneurysm. If there is a primary growth, such as sarcoma of the lung, the persistent extension outward from the mediastinum into the lung tissue clearly makes a differential diagnosis.

CONCLUSIONS.

1. The Röntgen rays are valuable in diagnosing any condition which will cause an increase or a decrease in density of the lung tissue.

2. The Röntgen rays will be useful in recognizing the position, fixation, or deformities of the curve of the diaphragm.

3. The size, position, outline, and character of peristaltic movements can be recognized with regard to the heart and the Röntgen rays will, therefore, give valuable evidence in the diagnosis of any condition which modifies any one of these factors.

4. Aneurysms and all tumor formations within the mediastinum can be recognized and usually definitely diagnosed.

1321 Spruce Street.

BLOOD TRANSFUSION.*

With Special Reference to the Citrate Method (Lewisohn).

By Charles Gordon Heyd, B. A., M. D.,
New York,
Adjunct Professor of Surgery, New York Post-Graduate Medical School and Hospital.

(From the surgical department of Dr. J. F. Erdmann, director of surgery, New York Post-Graduate Medical School and Hospital.)

The history of transfusion is of particular interest in demonstrating how a very useful idea was conceived in the minds of many men, how its application was carried on energetically for a period of time, and finally how it was discarded on account of the insurmountable difficulties encountered in its application. It is recorded that at the time Columbus discovered America an attempt was made to prolong the life of Pope Innocent VIII by transfusion, which was unsuccessful and resulted in the death of two donors.

At the present time there are two well established forms of technic known as the direct and indirect methods of transfusion. The direct method depends upon the approximation of the endothelium of the donor and the recipient. The first application of this method was by direct suture of the intima of an artery to the intima of a vein which was known as the direct arteriovenous anastomosis. This method has well defined limitations. It requires a high degree of special surgical dexterity, considerable time, and a strained and awkward position for both the donor and the recipient and has the further disadvantage of not permitting knowledge of the dose or quantity of blood transfused. An improvement in the direct anastomosis method was initiated by Crile when he devised a cannula for the approximation of intima to intima. The objection to this method of anastomosis was that it still required a high degree of special dexterity and had all of the disadvantages except suturing that were inherent in the direct anastomosis. The transfusions were usually from artery to vein and a number of complications and accidents occurred, the most important of which was acute dilatation of the right side of the heart of the recipient.

As a further elaboration of the technic of transfusion there were devised certain tubes for the purpose of bringing artery and vein together. These were simply tubes of glass or metal usually coated with paraffin to prevent coagulation and were associated with the names of Brewer, Lespinasse, Bernheim, and others. Fauntleroy, Dorrance, and Bernheim suggested a further improvement in making the transfusion from vein to vein, thereby eliminating one of the chief sources of danger from arteriovenous anastomosis, namely, the dilatation of the right heart.

All of these procedures were excellent and were founded upon a just appreciation of the elements that made transfusion safe, namely, the elimination of injury to the vessel and the prevention or inhibition of clotting. In general this was the condition of transfusion up to about 1912 when Lindeman resurrected an old idea and gave an efficient, practical method of indirect blood transfusion. The indirect transfusion embraces two well known methods. The first depends upon transferring blood from the donor to the recipient by means of syringes before coagulation of blood can occur. The second procedure disregards the time factor of clotting by the use of anticoagulants. The syringe method of Lindeman with specially devised cannulas was the successful application of a procedure carried out by Ziemssen about twenty years ago. Lindeman demonstrated that it was possible to withdraw blood in a perfectly plain sterile syringe and transfer it to the recipient before clotting could occur. The minimal clotting time provides an adequate interval for such a technical procedure. The conclusive proof that this could be readily and easily accomplished brought with it a number of methods all based upon the essential fact that rapidity of transfer prevented coagulation. A further elaboration recognized that the coagulation time was retarded by the use of paraffinized tubes such as the Klimpton-Brown and Percy tubes and the more complicated tubes of Satterlee and Hooker.

The syringe method required a fair degree of technical skill, an assistant your technical equal, and the precise coordination of movements between the two. It also required frequent washing of syringes to prevent coagulation. That it is not the ideal procedure is evidenced from the fact that there have been about twelve modifications of the Lindeman technic, the most noteworthy being the apparatus of Unger, Kush, Bernheim, and Miller.

It has long been a recognized procedure in laboratory technic to prevent coagulation of blood by a variety of chemical materials—oxalate, citrates, fluorides, etc. The utilization of anticoagulants had not been applied to blood transfusion for the simple reason that most of the anticoagulants in doses sufficient to enable a transfusion were highly toxic to the individual. This is the objection to the use of hirudin of Satterlee and Hooker which, although it effectively prevents coagulation, is very toxic for the individual if used for a 500 c. c. transfusion. It appears that Huston and Lewisohn, at about the same time, although priority must be accorded to Huston, conceived the idea of using definite concentration of sodium citrate for the purpose of preventing clotting and applied it for human transfusion. R. Weil had suggested blood transfusion by sodium citrate, but in a concentration much in excess of that used by Lewisohn. The present technical status of blood transfusion would seem to rest between one or the other of the various forms of syringe transfusions and the so called citrate method.

With a moderately extensive experience embracing all methods of transfusion it is my opinion that the citrate method for nearly all practical purposes, places transfusion upon simple, efficient grounds and its practical application within the means and technical skill of most practitioners.

Let us consider some of the conditions which transfusion may be reasonably expected to cure, and in which it may be expected to improve or to prolong life. The first and foremost indication is acute hemorrhage such as hemorrhage from trauma, from gastroduodenal ulcer, in typhoid, in ectopic preg-

*Read before the Jenkins Medical Association, October 14, 1915.

nancy, etc., and the hemorrhage associated with surgical operations, such as tonsillar hemorrhage, etc. Curtis and David have demonstrated that in conditions of profound hemorrhage a saline infusion will bring about an immediate reaction with a return to comparative wellbeing. It would seem that the system needs an immediate quantity of fluid and that the gross quantity of fluid, *per se,* is of manifest aid in the maintenance of circulation. The effect from saline is temporary and is followed in four to six hours by collapse and death. It follows then that the indication in hemorrhage is for a replacement of blood sufficient to maintain the circulation and carry on the physiological conditions of oxygenation; in other words, a large, massive transfusion of 700 to 1,000 c. c., or more.

When is the most favorable time for transfusion in a case of bleeding? If transfusion is done during the course of the bleeding it may cause the hemorrhage to continue. If transfusion is delayed the patient dies before it can be carried out. However, in the great majority of cases of severe hemorrhage bleeding continues up to a certain point at or near the mortality line, and then stops. In practice the transfusion should be done some time after this point is reached. Two experiences along this line are particularly impressing.

Case I.—A man thirty-six years of age had a pronounced gastric hemorrhage. The patient reacted after his hemorrhage and for three days no transfusion was performed, although everything was ready for a syringe transfusion at a moment's notice. The patient did not bleed again and on the morning of the fourth day transfusion by the syringe method was done and 700 c.c. of blood given. The patient had no further hemorrhages and at the end of ten days submitted to surgical intervention for the cure of his ulcer.

Case II.—A man, sixty-eight years of age, for four years had had severe hemorrhages from the bowel. During the first part of this year he had three separate attacks of hemorrhage from the bowel and almost died at the third bleeding. He reacted in a measure: hemoglobin had fallen to thirty per cent., red cells had fallen to 1,200,000. For forty-eight hours he was observed very carefully and finally the bleeding stopped. Three days later 600 c.c. of blood were transfused by the syringe method. He made an uneventful recovery and had no further hemorrhages.

The second indication for transfusion is to introduce blood for chemical purposes. Within this group come the transfusions for improvement or the cure of distinct hemorrhage diseases: hemophilia, purpura hemorrhagica, pernicious anemia, leucemia, etc. We have done a number of transfusions for pernicious anemia and except for a temporary improvement there has been neither a cure nor any permanency in the resulting improvement. In hemophilia blood transfusion has been successful in a large percentage of cases and is one of the best means that we have of bringing about a cessation of the bleeding. In those anemias that are secondary to nephritis, blood disease, and endocarditis transfusion has been of distinct service. If repeated doses of 200 to 350 c. c. of fresh blood are introduced into the circulation in a well defined case of secondary anemia with general impoverishment of the body, an intense activator of the hematopoietic organs is provided. Unquestionably the blood that is transfused is very rapidly destroyed and does not live probably longer than a week or ten days, yet we find that these patients exhibit two well defined clinical reactions. Within the first forty-eight hours a very marked rejuvenation and sense of wellbeing are noted and then, at the end of a week or ten days, a secondary pronounced reactive hematogenesis in which quantitatively and qualitatively the blood is markedly improved. In these cases small transfusions repeated every three to four weeks give the most benefit.

The third indication for transfusion comprises conditions of chronic sepsis such as chronic suppurative osteomyelitis, endocarditis of Streptococcus viridans origin or the chronic sepsis of a pylonephrosis, etc. We have yet to see transfusion accomplish any sustained benefit in a case of acute sepsis, such as an acute septicemia or acute pyemia. The most significant results have been observed in cases of chronic sepsis, particularly of the endocarditic group and especially when due to Streptococcus viridans. These particular forms of septicemia are essentially chronic, covering long periods of time and slowly resulting in exhaustion and death. In this type of cases we have had some very distinct cures, if one may so use the word, from transfusion. Here again a form of therapy is offered capable of extensive application.

Case III.—In a case of endocarditis due to Streptococcus viridans with positive blood culture we decided upon a series of blood transfusions. We anticipated giving doses of 200 c.c. of blood every three weeks over a long period of time or until such time as their futility was demonstrated. A strong, healthy donor was successively inoculated with a prepared vaccine of Streptococcus viridans obtained from the patient. This resulted in immunization of the donor, whose blood in addition to the chemical qualities would supposedly contain antibodies for a Streptococcus viridans infection. The patient had about six transfusions of from 200 to 350 c.c. from the immunized donor and at the end of three months the blood culture was negative and clinically the patient was cured.

Whether the patient would have recovered without the transfusions is of course impossible to determine. In acute sepsis we have never seen anything except temporary benefit from transfusion. Our transfused patients with acute sepsis have all died. It is interesting to speculate as to why a transfusion does accomplish something in conditions of chronic sepsis. We assume that a condition of chronic or continued sepsis gradually exhausts the immunizing potentialities of the patient. In other words, after a period of time there comes a break in the immunity and the patient is unable to neutralize the toxic effect of the infection and there is loss of weight and strength and progressive anemia with exhaustion. By blood transfusion we make a homologous transplant with its unknown biotic properties, antibodies, oxygen, serolysin, bacteriolysin, and other undetermined chemical properties.

A fourth "specific" indication for transfusion is carbon monoxide poisoning or methemoglobinemia. In these cases with a preliminary phlebotomy and the transfusion of an equal quantity of blood we have a specific method of therapy. This is apparent from the known pathology of hemoglobinemia.

We have seldom transfused for shock, as by the time we had completed our tests and were prepared to transfuse, the patient was dead or improved. We have not been impressed with the value of transfusion in diabetic coma or in cancer. For the capillary bleeding of chronic cholemia we have obtained better results from transfusion than from the injec-

tion of serum intramuscularly. Transfusion is particularly indicated in cholemia as a prophylactic agent against bleeding when operation is considered. In a case of pronounced icterus from occlusion of the common duct by pancreatic tumor we were able by two citrate transfusions to reduce the coagulation time from thirty-three minutes to eighteen and eight minutes respectively.

The donor must be a perfectly well, healthy young person between the ages of twenty and thirty years, without physical defect or apparent disease. Since transfusion has become so popular there has been created in the city of New York a class of professional donors who have established for themselves a scale of fees. Other things being considered it is better to employ a professional donor, for the simple reason that with him it is purely a business proposition and he is little if at all impressed psychically by the circumstances surrounding the operation. A rather interesting condition sometimes occurs in the nonprofessional donor. After having selected a healthy young man you find that upon inserting the needle he has been too profoundly impressed either from the slight pricking sensation or the circumstances surrounding the transfusion and goes into a condition not unlike a faint, with a rapid fall in blood pressure, so low in fact as to stop the free flow of blood. For this reason it is as a rule well to select somebody who has had some slight previous experience or one who is not of an excitable nature. It is always well in selecting the donor to take a rather careful history as to the man's physical condition. It has been our experience to select a man, find that he was Wassermann negative and his blood was perfectly compatible with the recipient's and upon careful inquiry elicit the fact that he had a history of recent chills. A smear of his blood demonstrated the malaria plasmodium. The Wassermann is the absolute serological test that should be made. We have seldom found our offered donors to be infected, but we always make a Wassermann test.

Considerable literature has been published on hemolysis and agglutination. Some authors, e. g., Bernheim and Horsley, say that they do not consider it of much importance. Our experience has been rather varied. Where time permits we always make a hemolysis and agglutination test, and we have refused a number of donors whose blood was incompatible with the recipient's or the serum of the recipient incompatible with the cells of the donor. Unfortunately the laboratory tests for hemolysis are not absolutely trustworthy.

Case IV.—In the case of a patient with pernicious anemia we obtained a donor whose blood by test was absolutely compatible with the patient's. We attempted a transfusion by the syringe method and upon introducing eight c.c. of the donor's blood into the circulation of the recipient, the patient complained of headache, vertigo, and nausea, and pronounced projectile vomiting occurred with the development of pain in the back and along the spine. We desisted in the transfusion and postponed the operation for a future day. Three weeks later we obtained another donor, went through the hemolysis and agglutination tests and found the bloods perfectly compatible. In this case after giving ninety c.c. of blood by the citrate method we had a pronounced picture of hemolysis and we desisted again. About a month later the operation was repeated and this time about 450 c.c. of citrated blood was transfused. The patient was returned to the ward in excellent condition. That afternoon she had a rather pronounced chill, temperature 104° F., respirations 30, pulse almost imperceptible, skin cold and clammy, and passed bloody urine. The patient remained in desperate condition for about two days and then slowly improved. The patient had a previous subicteroidal tint which was heightened during the two days succeeding the transfusion. Apparently there was some peculiar chemical property in her blood, due probably to the toxic process that may have been the underlying factor in her pernicious anemia, which was responsible for the hemolysis.

We have had other donors whose bloods upon laboratory examination were incompatible, but in practice proved compatible. On one occasion, by reason of the similarity of the names of the donors, we utilized a donor whose blood by laboratory test was incompatible, yet upon transfusion no ill effects were observed.

In the replacement of blood following an acute hemorrhage the dangers of hemolysis or agglutination appear to be almost negligible. In these cases as in all others we prefer to be protected by a laboratory report. If, however, it were necessary to do a transfusion without the aid of tests we should have no hesitation in doing it. Having assured ourselves that the patient was free from syphilis and under the circumstances preferably one of the family, we should give the transfusion, for it has been observed almost without exception that upon the attempted transfusion if the bloods are grossly incompatible there will be well defined symptoms of hemolysis which occur sufficiently early to stop the transfusion before irreparable damage is done.

In the anemias secondary to chronic infection or low grade septicemia the selection of the donor is of great importance. In these conditions a series of transfusions is required and not one isolated massive transfusion. Where we have obtained a positive blood culture and have isolated the particular infective agent and having obtained a donor who for a regular stipend places himself unreservedly in our hands, we immunize the donor for this particular form of bacteria. It is too early to determine whether this has had a very marked effect. My own impression is that it has not been a material factor. The element of value in these serial transfusions seems to be the biotic properties of fresh pure blood acting upon a patient whose resistance has been undermined by long continued sepsis. After a consideration of these factors the question to be determined is what method of transfusion will give the best result. If one analyzes the various conditions that enter into a successful transfusion he will find that there are roughly four. 1. It shall be accomplished with absolute asepsis. 2. It shall deliver blood unchanged. 3. It shall deliver a known quantity of blood. 4. It shall be simple and easy of application. A short survey of the subject of transfusion proves conclusively that the technical transfer of blood has long been far in advance of our knowledge of the inherent chemistry of the blood.

By any of the accepted methods it is comparatively easy to transfer blood from a donor to a recipient, but just what that blood will accomplish and just what condition will be induced by the transfer of blood remain unanswered. The syringe

method or its modification requires a high degree of coordinated team work and therefore it is inapplicable to cases where transfusion must be done rapidly and with the assistance possibly of a nurse or one other person. With that end in view we have come to the conclusion that the citrate method elaborated by Weil, Huston, and Lewisohn is best adapted to the use of the ordinary practitioner of medicine. The citrate transfusion method is based upon the use of sodium citrate as an anticoagulant and in practice we have a standard solution made up of distilled water 500, sodium citrate 10. Lewisohn has proved that the proportion of ten c. c. of this standard solution for every c. c. of blood transfused will prevent clotting for two or three days or even longer. For convenience we have the sodium citrate put in ampules of fifty c. c. of a two per cent. solution and a fifty c. c. ampule is sufficient for 500 c. c. of blood. Although sodium citrate retards coagulation if used in the strength of 0.2 per cent., Weil has demonstrated that during the first twenty-four hours after a citrate transfusion the coagulation time is lessened to nearly one half and at the end of twenty-four hours the coagulation becomes that of the blood previous to transfusion. Apparently in hemophilia a citrate transfusion with its diminution of the recipient's coagulation time would seem better indicated than the transfusion of blood with an ordinary coagulation time. The citrate method can be carried out with absolute asepsis, the quantity of blood given is accurately measured, and the technic is easy and simple. It does not, however, answer our condition of giving an unaltered blood. The effect of sodium citrate upon the organism in doses given with an ordinary transfusion of 500 to 1,000 c. c. exerts practically no effect upon the organism except the development of a polyuria. This is a rather frequent concomitant of the citrate method. So far as changing the blood is concerned it apparently makes no difference. It hastens the coagulation time for the first twenty-four hours and then does not retard the coagulation time beyond the previous normal time limit. Therefore we have become more and more convinced of the essential merits of the citrate method. Lately we have completed twenty-five consecutive transfusions by the citrate method with no bad results.

A distinct advantage of the citrate method is the fact that intercourse between the donor and the recipient is unnecessary; this is of particular value in the case of a patient who is very nearly dying from anemia or exhaustion. The accomplishment of the syringe transfusion causes a high degree of psychical disturbance and is associated with considerable reaction upon the part of the patient.

On one occasion we withdrew 700 c. c. of blood for a citrate transfusion and immediately gave 350 c. c. Two days later the remaining 350 c. c. were given without ill effects. At another time we withdrew 500 c. c. of blood for a citrate transfusion and gave 350 c. c. to one patient and 150 c. c. to another patient. The interval between the two transfusions was forty-eight hours. The citrated blood was kept in a refrigerator during the interval and showed, microscopically and macroscopically, no changes. Previous to the introduction in the second patient it is heated to body temperature by immersion in the container in a basin of hot water. Kaliski has withdrawn blood for citrate transfusion and then carried it to a recipient in another part of the city.

The citrate method is technically easy to perform. Repeatedly we have bled the donor in the operating room and given the infusion in the ward or private rooms. The subjective disturbances have certainly been less than with the manipulation incident to any of the syringe methods.

8 West Fifty-first Street.

A STUDY OF SIXTY-SEVEN CASES OF EPIDEMIC CEREBROSPINAL MENINGITIS.

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In this series of sixty-seven cases of epidemic cerebrospinal meningitis, observed during the latter part of February and during March and April of 1917, all the characteristic symptoms of the disease were present when the patients entered the Philadelphia General Hospital: headache, fever, rigidity of muscles and neck, opisthotonos, and various reflexes, as the knee jerk, were exaggerated. There were forty adults, of whom seventeen were colored; and twenty-seven children, ranging from two months to eleven years, of whom eleven were colored. Kernig's sign was present in all cases, while the Babinski was present in the adults and only in a comparatively few of the children. Brudzinski's signs were also present in some cases. Strabismus and pupillary changes were frequent and in one case ptosis was observed. Herpes developed in four cases among the adults and only one was noticed in the children. In only four cases were rashes demonstrable, varying from a slight erythema to purpuric and ecchymotic spots. Cheyne-Stokes respiration developed in one case after a too rapid administration of serum, and "sportive delirium" was seen in two adults after a deep stupor. The fluid withdrawn varied in amount from ten to 400 c. c., depending upon the time the case was under observation and the number of punctures made.

Some patients were moribund when brought into the hospital and hence only one puncture was performed, while in those cases under observation for a longer time, as many as fourteen punctures were made. In one case, 330 c. c. were withdrawn in forty-eight hours and no untoward symptoms followed, nor in any case where thirty or forty c. c. were removed as a routine at one sitting. The fluid in the majority of cases was turbid with an abundant, tenacious sediment. Some fluids were deep yellow, clear, and contained coagula, which made the fluid appear almost solid. In one case a clear fluid was obtained and no organisms were found, but three days later a cloudy fluid was obtained in

which the leucocytes were abundant and meningococci were present. In no case was a spinal puncture made after a dose of antimeningococcic serum earlier than eight hours, and this consistency is apparently not due to withdrawal of the serum. When the fluid was perfectly clear, without sediment even after standing or centrifugalization, which was seen in only eleven of our adult cases, recovery almost always occurred. The turbid fluids all showed polynuclear leucocytes in excess and few showed a large number of endothelial cells. The pressure of the fluid was variable, some exhibiting none and others a marked degree.

In the adults, of whom we had forty cases, the disease previous to admission to the hospital was not always recognized, as a number were diagnosed as alcoholism, delirium tremens, influenza, and some as confusional insanity. Some of the children had been ill for a week or ten days up to three weeks before coming under observation and receiving a correct diagnosis.

On account of the length of time intervening between the onset and entrance into the hospital and institution of serum treatment, great headway had been made in the disease. As mentioned previously, some of the patients were almost moribund when brought in and others lived only three or four days. In one instance a man was brought in with a diagnosis of delirium tremens. Cloudy fluid was withdrawn and meningococci and pneumococci were found. Death occurring in less than twenty-four hours after entrance to the hospital, an autopsy was performed. A fracture of the skull, partial solidification of both lungs, and a basilar meningitis were found. Spreads made from the base of the brain showed pneumococci, but no meningococci. One case was exceptionally interesting. It was one of the most severe studied. An extreme degree of opisthotonos developed and the patient had priapism lasting five hours. On one occasion an attempt was made to pass a nasal tube to feed him, but it was unsuccessful on account of the rigidity and general spasm. Semiconsciousness set in, the spasm partially relaxed, and the patient succeeded in rolling over on his abdomen and grasping a cup, successfully fed himself, and from that hour made an uneventful recovery. The spine was so rigid during the opisthotonos that several attempts to puncture the canal were entirely without result.

Diagnosis.—The diagnosis was made in every case from spreads when the fluid was first delivered to the laboratory. In most cases the organisms were few, and the extracellular as well as intracellular characteristic Gram negative diplococci were found. After a dose of serum was administered and although the fluid was still turbid and polynuclear leucocytes were abundant, it was most difficult to demonstrate meningococci. On account of the scarcity of organisms and constant increase in number of new cases, cultures were made upon blood agar after a diagnosis was made in spreads from the initial fluid. About two or three c. c. of fluid were used and in some cases a large amount of sediment was poured upon the medium to insure a growth. In the majority of cases, thirty-six, a positive culture was obtained, consisting of the irregular sized Gram negative diplococci. In a few cases, contaminating organisms, as pseudodiphtheria bacilli, were encountered. Cultures were made in most cases immediately after the withdrawal of fluid, though several hours elapsed in many before inoculations.

In four fatal cases a nonhemolytic streptococcus was found in addition to the meningococcus, and in the one case of fracture of the skull pneumococci were present. In one other fatal case pneumococci were found in spinal fluid one week after diagnosis of meningitis was made. This patient acquired a frank pneumonia and died. In one of the cases of herpes labialis, a Gram negative diplococcus corresponding to the meningococcus both culturally and microscopically was isolated.

Studies of cultures upon blood agar were made from the nasopharynx in thirty-five instances, including patients, resident physicians, nurses, and attendants. In only three was a Gram negative diplococcus corresponding biologically and morphologically to the meningococcus found. One of the cultures from the nose was made from one of the two children in whom an endocarditis developed as a sequela. The spinal fluid had been perfectly clear for a long while, no organisms were demonstrable, and only a few leucocytes and endothelial cells were observed. The children, however, had a slight rise in temperature for a number of days before the endocarditis developed.

Treatment.—The treatment, as soon as a bacteriological diagnosis was made, consisted in the injection of antimeningococcus serum. In some cases fifteen c. c. were given, but in most all cases the initial dose was twenty to thirty c. c. After this dose, no matter how much fluid was withdrawn, thirty c. c. was the regular dose. In one case only 2.5 c. c. of fluid were obtained by puncture, yet thirty c. c. of serum were given. This amount of serum was given sometimes daily, sometimes in severe cases twice daily, and in others every second or third day according to the severity of the case. In some whose illness lasted over a week or ten days a total of 300 c. c. was given, and where these large amounts were given, from 300 to 435 c. c. of cerebrospinal fluid had been withdrawn. In most of the fatal cases the serum did not in any way alter the character of the fluid, the only marked point being a diminution of the number of or absence of microorganisms in the fluid. In one or two instances, flushing the spinal canal with normal salt solution was tried, but with no good results. Following the administration of the serum, headaches were common, cramps in the legs were almost constantly noticed, and in only one case was syncope present, and this followed the too rapid introduction of the serum. In three cases urticaria developed after the third or fourth injection of serum. In one of these the wheals were of the giant type.

RESULTS AND CONCLUSIONS.

The summary of the cases is as follows: Number of adults: forty, of whom twenty-three were white and seventeen colored. In this group, the mortality was approximately fifty-five per cent., fourteen white and eight colored. Eleven patients

are now convalescent. Number of children from two months up to eleven years: twenty-seven, of whom fifteen were white and twelve colored. The mortality in these children was 40.7 per cent., seven white and four colored. In one, an extremely mild case, recovery took place without any serum being given, and in another, recovery followed the injection of fifteen c. c. Serum treatment should be instituted at once after a bacteriological diagnosis is made, and the longer time elapses before its administration the more unfavorable the prognosis. It is a well known fact that the mortality has been reduced from eighty per cent. to between twenty and thirty per cent. in some epidemics. In this epidemic the mortality was exceptionally high, although the serum treatment was instituted as soon as the case was diagnosed and some even before a diagnosis was confirmed bacteriologically.

It is our firm belief that if these cases had been diagnosed earlier, and the serum given immediately, the mortality rate would have been decidedly reduced. It is also possible that in this series of cases the meningococcus was of an extremely virulent type, as it was proved in animal inoculations by Doctor Robinson. In view of the high mortality in this epidemic and the possible high mortality of other epidemics, it does not seem unwise to recommend that a dose of antimeningococcus serum be given in suspicious cases of meningitis where a cloudy cerebrospinal fluid is withdrawn upon puncture. It appears reasonable to insist upon lumbar puncture in all cases where a suspicion of meningitis exists, as there were a number of instances in this group where no puncture was made and others where puncture was made a number of days after the case came under observation.

The disease is of such a nature that specific treatment to be of any value should include administration of serum at the earliest possible moment. The adult patients were kept in the medical wards most of the time and no new cases developed. The children were all segregated in the isolation buildings, and attended by nurses and helpers. No new cases developed in nurses or attendants. In two instances three cases developed in one family, but in no other instance were multiple cases observed. In those who lingered a week or ten days the number of sequelæ was extremely small; one patient became deaf and one was stricken with blindness in the left eye. In two cases an endocarditis developed after convalescence had been progressing for more than two weeks.

We wish to extend our thanks to Doctor Lineberry and Doctor Hostetter for the valuable assistance rendered in the compilation of these data.

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Cartilage Grafts in Cranial Defects.—Thomas Young Simpson (*British Medical Journal*, April 21, 1917) has found a simple and efficient method of closing cranial defects by means of one or more thin plates of cartilage, cut from the patient's false ribs and placed on the dura mater with the edges extending beneath the bony margins of the opening. The scalp flap is then returned to place and stitched down.

ACUTE APPENDICITIS.

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As the discussion of the surgery of any organ, to be well based, must be founded on the sure rock of the knowledge of the underlying pathology, we may properly consider this side of the question first. According to Aschoff, whose investigations along the line of the pathology of the acute infections of the appendix are most satisfactory to the clinician, there is no such thing as a primary catarrhal inflammation of the appendix. He states that in all cases there is a primary lesion or focus of infection, primarinfect, which is located in the subepithelial layer of the appendix itself, the point of actual origin of the inflammation being the depths of the appendicular mucous crypts. Here there is first a collection of neutrophile leucocytes, gathered as the result of the introduction of infection to the depths of the crypts, in almost all cases from a Gram positive diplococcus or bacillus. Over the area involved the mucous membrane is usually destroyed and its place taken by a plug of fibrin and leucocytes. As a rule a number of these little primary foci are formed. They are microscopic in size. These little primary lesions have a decided tendency to progress toward the serosa of the appendix and it is not unusual to find the peritoneal coat involved and perforated before the mucosa has been destroyed. If these primary foci progress rapidly toward the peritoneal cavity multiple minute perforations will occur; if, for any reason, their peritoneal march is deflected, coalescence of the foci is likely to occur and a widespread subepithelial infiltration takes place; this area of coalescence may involve a part or the whole of the wall of the appendix and may proceed in one of the following ways: 1. The mucosa may be destroyed and the infected coat of the appendix may drain itself into the lumen of the appendix and then on into the lumen of the large bowel, with control of the infection by this "autodrainage," with the result that a secondary condition of catarrhal inflammation may exist, which in turn may terminate in complete resolution with the formation of scar tissue in the mucosa of the appendix; or this secondary inflammation may persist as a true chronic inflammation of ulcerative type. 2. The original tendency of the primary lesion may be preserved and the march to the peritoneal covering of the appendix may continue, with the result that macroscopic perforation occurs. 3. While exhibiting the original tendency of the primary lesion to progress to the serosa, the primary focus or coalesced lesion may invade the mesoappendix, there spread to the bloodvessels, the veins, produce widespread inflammation of the bloodvascular elements, resulting in hemorrhagic infarct with large perforation of the wall of the appendix as the result of tissue necrosis.

To reduce these views and statements to simple terms the entire matter may be stated thus: We start with the formation of the primary lesion and with the knowledge that this pri-

mary lesion possesses the tendency to progress toward the peritoneal coat of the appendix. We can outline this as follows:

I. *A primary lesion, single,* 1, may undergo resolution with resulting microscopic subepithelial scar; or, 2, may ulcerate by destruction of overlying mucous membrane, with the following result: resolution and formation of microscopic mucous membrane scar, or continuation of the inflammation with production of a chronic catarrhal or ulcerative process of microscopic size. 3. The single lesion may progress to the serosa with the result that microscopic perforation occurs with attending infection of the peritoneal cavity.

II. *A primary lesion, multiple,* 1, may remain as multiple discrete lesions that may undergo any of the changes indicated above in subdivisions 1, 2, or 3, except that the resulting pathology is multiple instead of single. 2. The primary lesions may coalesce, forming lesions which may undergo any of the changes of the single primary lesion indicated in the former subdivisions, except that the resulting lesion will be macroscopic in size. 3. In either 1 or 2 the process may spread to the mesoappendix, there involve the blood vascular elements, the veins, producing thrombosis with resulting hemorrhagic infarct and large perforation the result of widespread tissue necrosis.

In further explanation it may be well to say that while the primary lesions are likely to be multiple it is quite conceivable that in any given inflamed appendix we may find evidences of both the discrete lesion, and of the coalesced lesion, and that this combination of the two varieties would be the condition most likely to be met with in inflammation of any marked extent. Also it is well to note that the lesion which involves the mesoappendix is productive of much greater tissue destruction because of the added element of widespread thrombosis, and the clinical aspect of the case is increased in gravity because of the greater danger of pylephlebitis, of which serious condition the mesoappendicular thrombophlebitis may be the primary stage. And it may be well, too, to consider that the formation of the primary lesion, quickly controlled, may occur without sufficient clinical manifestations to make diagnosis possible.

As Ashhurst points out in his admirable book on surgery, it is easy to make apparently discordant views agree in the main if we accept the above teaching, for those who hold the view that an attack of acute appendicitis occurs only in a chronically inflamed appendix need only to look upon the chronic inflammation of the appendix as the result of the formation of primary foci which have not undergone resolution, it being admitted that such formation of primary foci, while in fact an acute attack, may occur without sufficient clinical manifestations to make diagnosis possible. It is easy to see that the distinction is merely academic and it is equally easy to see that to pursue the discussion will result in the degeneration of a dignified review of arguments, pro and contra, into the profitless search for the answer to the classic question, "Which is entitled to priority, the hen or the egg?"

To sum up, the conclusions to be drawn from Aschoff's teaching about the primarinfect, in the majority of cases, are these: 1. The primary lesion located is in the appendix itself. 2. The appendix does not become involved in a catarrhal process, primarily. 3. The appendix does not become involved in inflammation as the result of the extension to it of inflammation of the mucosa of neighboring parts of the gastrointestinal tract. 4. The appendix, once involved in intrinsic inflammation, never returns to normal, but remains either in a state of chronic inflammation or is permanently injured and distorted by the healing process which follows upon the heels of the acute attack of inflammation.

The behavior of the peritoneum is most important and it is safe to look upon peritoneal reaction as an accompaniment rather than a complication, for I believe that any attack of acute inflammation of the appendix, which is of sufficient severity to give definite symptoms which are diagnostic, is always accompanied by some involvement of the neighboring peritoneal surfaces of intestine, omentum, or abdominal wall. Whether that peritonitis is to be localized or diffuse, with or without exudate, which may be clear or purulent, depends upon one of the following three factors, or rather upon their interrelation: 1, the efficiency of the protective forces of the body, both general and local, as applied to the specific infecting organism; 2, the nature and condition of virulence of the particular organism itself; 3, the dose of the infection, i. e., whether large in amount and small in length of time, or vice versa; which is practically equivalent to saying whether perforation occurs slowly or rapidly.

Clinically and from the standpoint of the gross pathology of the structures certain peculiarities in the progress of the pathological lesion are observed: The tendency to perforation is markedly increased by the presence within the appendix of a foreign body, this term to include fecal concretions, enteroliths, etc. The entire condition is made more rapid and destructive if the lumen is destroyed near the base, thus converting the entire length of the appendix into a blind pouch with the resultant marked increase in the virulence of the contained organisms. The tendency to perforation, either microscopic or macroscopic, with gangrene either partial or complete, is very marked in children, and this marked tendency to invasion of the peritoneal cavity in children, together with the rather inefficient protective forces of the child against peritonitis—probably due in large measure to the undeveloped condition of the omentum—makes early diagnosis especially important in this class of case. The appendix once involved in intrinsic inflammatory reaction never returns to normal, either remaining as a permanently damaged structure without a contained inflammatory focus, or lapsing into a condition of chronic inflammation with ulcerations of the mucosa, and infiltration of the subepithelial layers with round cells.

Position.—The position of the appendix has received a great deal of attention from various authors and great stress has been laid upon its peculiarities of position. It is true that we occasionally find the appendix in peculiar places, but it is equally true

that in the vast majority of all cases the appendix and its symptoms are found in the right iliac fossa, a description of its position which is as restricted in area as it is wise to make and which is infinitely to be preferred to the definite points of McBurney, Munro, *et al.* The surgery of the acutely inflamed appendix is truly the surgery of a region, and cannot properly be cramped within the space of a square inch. Occasionally the appendix is wholly or in part an extraperitoneal organ without complete peritoneal investment, and thus is difficult to find, especially in cases in which the appendix is sought for in the course of a laparotomy done for some dissociated condition and in which the operator feels called upon to remove the appendix as routine prophylaxis. As a rule, the appendix is found in the right iliac fossa pointing upward and inward, upward and outward, or downward and inward. Disease may distort it and alter its position and adhesions may bury or obscure its normal relations or outlines. Two positions are of importance because of their influence upon diagnosis and operative removal, the so called retrocecal or retrocolic position, and the pelvic position. In the retrocecal or retrocolic position, which is found in from ten to fifteen per cent. of all cases which come to operation, in my experience, the appendix lies close to the cecum or colon, usually firmly attached to the posterior abdominal wall or the large intestine, and usually both, and is overridden by the inflamed cecum or colon. This position of the appendix may occur either lateral to the cecum or colon—the usual position—or mesial to it. Its chief interest in this position lies in the fact that there is danger of confusing its symptoms with those originating in a diseased gallbladder or kidney, and also in the fact that operation is rendered slightly more difficult. In the pelvic position the appendix points almost directly downward and is wholly or in great part within the pelvis proper, and so in relation with the pelvic peritoneum whose reaction to inflammation differs somewhat in symptomatology from the peritoneum of the general abdominal cavity. Here the danger is that a severe inflammation may masquerade under symptoms which are misleading because of their apparent mildness. In diseased conditions we occasionally find the appendix adherent to gallbladder, spleen, kidney, median line of the abdomen, either anterior or posterior wall, and rarely it is found stretched across the abdomen and adherent to the sigmoid colon, or the upper rectum. Incidentally in this latter type of inflamed appendix, I am convinced that the primary lesion lies in a diverticulum of the sigmoid, in a fair percentage of cases; the diverticulitis is not recognized at the operation for the drainage of a localized abscess, the appendix being inflamed merely as the result of its association with the abscess as part of the abscess wall, the inflammation of the appendix being secondary and extrinsic, the result of extension of infection through its peritoneal coat. This would account for two peculiar facts—first, the comparative rarity of reported cases of diverticulitis, and, second, the fact that patients with left sided abscesses do remarkably badly as a rule—the prognosis of diverticulitis being notoriously unfavorable.

Occurrence.—In a general way a bird's eye view of the occurrence of acute appendicitis may be well secured in this way: It is very rare in infants; uncommon in very young children; common in older children; very common in young adults; common in adult life; uncommon after fifty; and rare in old age. Thus we have an ascending scale which, starting at zero in infancy, steadily climbs till it reaches its high point at about thirty, after which the scale becomes a descending one till it again reaches zero in extreme old age.

Predisposing factors.—As predisposing causes we must turn first to errors in diet. Here we must lay the ban especially upon excessive meat eating and the ingestion of overripe or underripe fruits and vegetables. Habits of diet which tend to constipate unquestionably have their influence in the causation of this condition, for constipation tends to make the emptying of the appendix itself more difficult, and by the production of stasis therein, increases the virulence of the bacterial content. So, too, gastroenteritis of any kind acts in the same way, namely, by increasing the virulence of the bacterial content of the gastrointestinal canal.

Exciting cause.—The exciting cause is, in every instance, bacterial invasion, and this invasion is in most cases in the form of the streptococcus, which is soon superseded and overgrown by the pyogenic cocci of the common varieties, the Bacillus coli communis, pneumococcus, etc. Perhaps the most commonly found organism, the Bacillus coli, gets altogether too much credit for the causation of this condition, and probably has the same relation to the inflammation as does the colon type of human animal who waits for someone to start something and get it well under way, and then jumps in, makes a great fuss and noise, and takes all the credit.

Symptomatology.—The teachings of the late J. B. Murphy, of Chicago, have left an indelible impression upon the consideration of this phase of the question, and in many ways it is well to follow his lead. I believe that his insistence upon the chronological position of the various symptoms is too dogmatic and that it would be well for the clinician to be on his guard in this respect and be ever ready to place reliance upon his examination of the patient rather than upon the success of his efforts to draw, from an acutely ill patient, a chronologically exact history in reference to the order of appearance of the classic symptoms. These signs and symptoms are as follows: pain; nausea and vomiting; tenderness and rigidity; temperature and increased pulse rate; leucocytosis; and eventually a mass.

Pain.—The primary pain of appendicitis is practically always referred to the epigastrium a little above the umbilicus, and in the median line. It is cramplike in character and, as a matter of fact, is probably the result of disorganized peristalsis of the small intestine, which, in turn, is caused by the convulsive peristalsis of the appendix in its efforts to rid itself of its infected contents. It is the first sign of appendicitis in the matter of time. Pain in atypical attacks may not be referred to the epigastrium and may come on first over the location of the appendix, and this is especially true of attacks occurring subsequent to the initial attack. As a rule

the appendix which directs immediate attention to itself is the appendix which is buried in adhesions and is relatively immovable. After the primary pain has persisted for a varying length of time, usually several hours, it changes both in position and character, being referred to the right iliac fossa, and becoming constant, steady, and of a boring or dragging character. Sudden cessation of pain is a danger sign unless all other signs improve simultaneously, one of the most suggestive signs in the occurrence of gangrene being a sudden cessation of pain. The recurrence of pain, or the changing of the localized pain to a general pain, is suggestive of the occurrence of a diffuse peritonitis because of the failure of the primary defense in the right iliac fossa, i. e., the breaking apart of the agglutinated surfaces, perhaps, and the extension of the infection over a greater area of the peritoneum.

Nausea and vomiting.—The nausea and vomiting are early symptoms and tread close upon the heels of the primary pain. The primary nausea and vomiting are slight and not often repeated. The nausea is comparable to that experienced by the patient who has a stone impacted in the kidney, ureter, bile passages, or bladder, and it, too, may be explained by the efforts of the acutely inflamed appendix to free itself of its contained infectious material or focus. Vomiting which comes on after an interval in acute appendicular attacks is different in type and causation; it is the vomiting of peritonitis and has the characteristics of such vomiting, being merely an emptying of the stomach of the irritating contents of the upper small gut, and occurring without great effort on the part of the patient, who spares himself the contraction of his abdominal muscles which would be productive of pain. Persistence of vomiting usually indicates a spreading diffuse peritonitis with the invasion of more and more of the peritoneum and is the indication of an uncontrolled and perhaps uncontrollable infection. It is an insistent cry for help from the patient and should be so interpreted by the surgeon. Vomiting is very likely to be absent in the patients whose appendices occupy the pelvic position, for here the peritoneal reaction to infection may not be expressed in terms of nausea, a peculiarity of the region itself.

Tenderness.—This is at first general over the location of the small intestine, but quickly transfers itself to the right iliac fossa. It is probably a great deal earlier in its occurrence than we are inclined to believe, because, in many instances, it is not sought for until the patient calls the attention of the doctor to the fact that the original diffuse pain has localized. The typical tenderness of appendicular inflammation is "point" tenderness, which can be appreciated by pressure with the point of the finger, and which is exquisite, as contrasted with the general soreness of the iliac fossa. It is usually found about an inch below the points of McBurney and Munro, which points indicate the position of the ileocecal valve. In retrocecal positions of the appendix the point of tenderness can be found about half way between McBurney's point and the free border of the ribs, "a little too high for the appendix, a little too low for the gallbladder, and not far enough back for the kidney." In children, especially, I would lay particular stress upon the rectal examination and the detection, thereby, of a tender point along the right brim of the pelvis. Unquestionably the rectal examination is of great value.

Rigidity.—Rigidity is the mainstay of diagnosis in acute inflammation about the appendix. It is an indication of inflammation about the appendix, and is our most reliable diagnostic point. It is appreciated by light palpation over the right rectus and the right iliac fossa, and I make it a rule when examining for rigidity to approach the region from the portion of the abdomen which is totally free from pain, if there is such a portion. The characteristic rigidity is of reflex nature and it should be the aim of the examining surgeon so to handle the abdominal wall that all voluntary resistance, the result of fear on the part of the patient, is done away with if possible before the hand is allowed to investigate the actual region of disease. I always try to determine first whether the right rectus is more resistant than the left, then if the lower part of the right rectus resists more than the upper, and finally if the area over the actual site of the usually placed appendix is more resistant than the similar point on the left side of the abdomen. This method of gently and slowly creeping up on the inflamed appendix tends to unmask the rigidity and give real information to the examiner. It is, of course, understood that rigidity is a symptom of the peritoneal inflammation about the appendix, this localized peritonitis being properly considered a part of the condition and not a complication. Upon the skillful elicitation of the sign of rigidity depends the correctness of the diagnosis in the doubtful case.

Temperature.—Temperature is seen within a few hours of the first pain of appendicitis and is, in the average case, an elevation to 100.5° to 101° F., perhaps a degree or so higher in children. Very high temperatures I am accustomed to look upon with suspicion in the early stages, as perhaps indicating chest inflammation with referred pain. Of course when the case has gone on to abscess formation within the peritoneal cavity the temperature takes on the usual abscess type and is as a rule higher than just stated. The occurrence of a chill at the inception of an apparent acute appendicitis is also a sign which I look upon with suspicion, especially in children, in whom the exanthemata occasionally simulate intraperitoneal inflammation. The occurrence of a chill after the primary rise of temperature I am accustomed to look upon as a distinctly suggestive sign of the occurrence of gangrene. A sudden fall in temperature is a bad sign, gangrene or perforation being indicated unless all other signs improve in like manner.

Pulse.—Observation of the pulse rate may frequently put the physician on his guard early in an attack of acute abdominal pain. As a rule I should say that the pulse rate is increased almost from the beginning of the attack and the increase is surely present before fever occurs. As a rule the pulse gains fifteen to twenty beats on the temperature and holds that ratio of increase for about forty-eight hours, or until the temperature begins to indicate serious involvement of much peritoneal surface. The actual character of the pulse differs so in indi-

viduals that I have come to feel that the rate alone is reliable.

Leucocytosis.—Leucocytosis is constant in this condition and is of great importance both as a matter of diagnosis and of prognosis. It is to be borne in mind that the total count of white blood cells is indicative of the resisting powers of the patient to the particular infection, while the percentage of polymorphonuclear cells is a good indication of the virulence of the infecting organism. Percentages of ninety or above mean that the infection is of such a nature that gangrene is likely to ensue. Percentages of eighty to ninety mean that the infecting organism is of such character and virulence that the inflammatory reaction will not stop short of the formation of pus. A total count which is steadily rising with a stationary percentage count or one that is falling is a good prognostic sign. A falling total count with a rising percentage count is of bad prognostic import. The very high counts, 30,000 or more, make me suspicious of pneumonia, some other form of general infection, or gallbladder infection. Once the diagnosis has been made I am accustomed to place great faith in the white blood count, looking at it from the standpoint of prognosis.

Mass.—Mass is a positive sign of appendicular inflammation which comes as a rule when we do not need it to make the diagnosis. It occurs very rarely within the first sixty hours. The matter of the "apparent mass" has been dealt with in speaking of rigidity. The real mass of appendicitis is an indication that the peritoneal cavity has been definitely invaded by the infection. The mass consists of adherent coils of intestine, omentum, and parietal peritoneum. It is readily appreciated, as a rule, by the flat of the hand applied to the right iliac region and, in children especially, by rectal palpation. The size of the mass is no indication of the amount of contained pus, massive adhesions frequently forming about an acutely inflamed appendix without macroscopic pus. Mass is a condition which has relatively little diagnostic importance because when it occurs the other signs of the condition are well marked and the diagnosis is not much in doubt. Mass, however, I am accustomed to look upon as a distinct indication for drainage of the operative wound whether pus is apparent or not.

(*To be concluded.*)

Treatment of Acute Gastritis.—Harold H. Redfield (*Medical Summary*, April, 1917) states that in his treatment he tries to assist Nature to correct the condition. If there is a tympanitic or dull note on percussion over the stomach, lavage should be done, and if emesis should seem desirable apomorphine hydrochloride may be given in the dose of 0.005 gram hypodermically. The diet during the first few days should consist of milk with the addition later on of strained barley water or weak tea. When the appetite reappears about the fourth day light soups should be allowed with an occasional soft boiled egg. If there is pyrosis calcined magnesia, sodium bicarbonate, and peppermint sugar should be given in equal quantity every two hours, and pain may be controlled by codeine.

OBSERVATION AND INSPECTION IN THE PHYSICAL EXAMINATION IN PULMONARY TUBERCULOSIS.

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The physical examination in pulmonary tuberculosis should lead to the recognition of the signs in the early incipient state of the disease, as their detection in the moderately advanced stage, with present knowledge and experience, should present little difficulty. The chief methods in the physical examination are: inspection, palpation, percussion, and auscultation. It is difficult to say which of these four is the most important and useful one, but it can be said with certainty that auscultation is the method most practised and relied on; the other methods are usually depended on in the reverse order they were enumerated.

Inspection, or observation, as I prefer to call it, is practised by many, but with little study or analysis. Most practitioners consider that inspection begins when the patient is stripped and observed for respiratory movements, general outlines and symmetry of the chest, the relation of the clavicles, the position of the scapulæ, and so forth. This is not sufficient; observation should begin earlier. It should be begun with the entrance of the fully dressed patient into the office or examining room. His gait is to be noted, his facial expression should be studied, his posture when sitting or standing should not escape attention; his manner in talking and answering questions must be considered.

Each observer has his individual method in examination and from time to time discoveries of new signs are announced, which are very important according to the observer's opinion. All signs are important, but one man may elicit one sign better than another observer, or he may elicit it in a different way and therefore think he has discovered something new.

In this paper I intend to discuss observation and inspection as aids to the diagnosis of early pulmonary tuberculosis. I am certain that I have not discovered anything great or new, but years of experience have developed my own technic, and because of a difference in the personal equation it differs in some respects from the ways of others; and the more ways and variations we know and practise in arriving at a diagnosis, the better we diagnose.

Patients who present themselves for examination may come of their own free will, or they are brought in by their frightened friends or relatives. Those who come by themselves are usually of a more intellectual type, and a good history may be obtained from them. They are seldom nervous, they take things philosophically, and their suspicion of being afflicted with pulmonary tuberculosis has usually some good foundation. In weighing the evidence from observation and inspection, if the other evidence is not sufficient and conclusive, their coming to be examined should be laid on the positive side of the scale. There will also be a considerable proportion of scared and nervous persons who apply for an examination. Their coming can-

not be considered as evidence that leads to a positive diagnosis, as it is due often to the reading of patent medicine advertisements or to the fact that some distant relative or a neighbor died or is suffering at present from pulmonary tuberculosis. A thorough investigation of their fright should be made, and if found reasonable it is important not so much in the diagnosis as in the prognosis of the case, if it should prove to be a positive one. The prognosis in a nervous patient is always more grave than the prognosis in a philosophical patient, who can cooperate intelligently with the physician.

Patients who are brought or forced into the office by a frightened friend or relative should also be classed as intelligent, nervous, or ignorant. Their visit is less suggestive than the coming of those who come voluntarily. Their willingness or unwillingness to answer questions is to be noted. If they give a decided negative answer to all questions they should be suspected of hiding the truth. A question should be put to them, the answer to which is positive in the best of health, and the result will be selfconvicting. It is habitual, though, with some not to admit even to themselves that they are ill. A total denial of any and all symptoms, a negation to every question, should add weight to the positive evidence of disease if it is suspected through the other methods of physical diagnosis.

It is best not to hurry with the invitation to the patient to be seated. After scrutinizing the patient's face on entrance, receiving the impression as to his intelligence and nervousness, and ascertaining whether he came of his own volition, or was forced by friend or relative, let the patient stand a while and be watched as to postures assumed.

In health the human body is symmetrical; disease distorts this symmetry to a certain extent. Healthy people as a rule assume on standing an evenly balanced position. A few may rest more on the right leg and throw the left somewhat forward; this is probably because the liver, the heaviest internal organ, is on the right side. Should the patient throw the balance on the left thigh, suspect the left lung. By leaning on the left side the patient immobilizes partly that side of chest; he fixes the side by preventing respiratory motion, principally the expansion of the chest on the fixed side. This is especially true if the focus is situated near the diaphragm or is close to the pleura. This is done by a number of patients even in the earliest stages of the disease without any conscious purpose. Should the patient while standing rest more on the right leg he should be directed to change the position. The patient's mind must be distracted now by some conversation, and he should then be watched to see whether he resumes the former posture. If he does, it is then certain that there is a diseased condition on the right side. In enumerating various signs as found in my practice, I wish to emphasize the fact that under no circumstances are they considered pathognomonic, but only suggestive of a diseased condition and indicative of the main focus.

After the patient's facial expression and his posture on standing have been observed, he should be invited to be seated. In doing so the patient must be thrown off his guard, as at about this time he has found himself and he usually watches the physician more closely than the physician watches him. If the patient is timid, downcast, and pessimistic, he should be addressed in a friendly and cheerful way; if he is too much at home, voluble, or pert, he should be addressed coolly and shortly. History taking should now be begun, and patient watched as to positions assumed while seated.

While seated the patient may try in various ways either to fix the diseased side or to give more room for expansion to the healthy side. He may lean to the afflicted side, or he may slightly fix it by pressing it harder to the back of the chair or by keeping his arm closer to the chest on the diseased side. Resting the arm on the side of the chair or on the edge of the table usually does the opposite; it gives more room for expansion; but placing the elbow on the arm of the chair and supporting the head limits the expansion of the chest on the side so supported.

Crossing the legs while seated may indicate a diseased side. There are two ways of crossing legs. In the thigh over thigh crossing, the side of the thigh raised is partially fixed. The other way of crossing the legs is raising and resting one leg on the thigh of the other; this gives more expansion on the side of leg raised. An action which may be noticed with the second method of crossing the legs, is pulling with the hand opposite to the thigh so raised at the shoe or cuff of the trousers; this motion usually fixes the other side. Of course all these movements may be the result of bad habits or ill manners, or they may be caused by the nervous condition the patient is in during the examination. The patient should therefore be requested to change his position and even to change his seat while the history is being taken, and if after distracting his mind by the continuation of history taking the patient assumes the former posture, or one analogous to it, this deportment then becomes more suggestive.

After the patient has been observed as to his favorite positions while standing and sitting, he should be told to undress. It is customary to let the patient disrobe behind a screen in privacy. I believe this method to be in opposition to the best interest of the patient. He should strip in the presence of the physician, who notes postures assumed or, what is more important, unnecessary movements made while undressing. All these should be noted and analyzed, and the cause of them ascertained. While watching the patient undress, his habits and cleanliness may be learned, and this will help to some extent in the prognosis of the case.

To proceed with a closer examination let us begin at the top. In observing the hair we must note whether it has a natural color and gloss, or is dull, having lost the healthy lustre. Tuberculosis, beside its other properties, is a toxemia, and it affects all organs and tissues of the body directly and remotely. The hair is frequently affected in pulmonary tuberculosis, it loses its lustre and becomes dry, and the color fades somewhat. After noting color, lustre, and general changes in the hair, the condition of the scalp should be examined. Almost invariably dandruff will be found in persons suffering from pulmonary tuberculosis; it may not be pronounced,

but there is certain to be evidence of its presence in the great majority of cases. This condition of the scalp is probably due to the same cause as the loss of natural lustre in the hair. In cases where the scalp seems to be in a good condition, the use of oily hair tonics should then be ascertained by observation and direct questioning.

In inspecting the skin and its appendages, blemishes of the mildest kind should be considered. These are usually caused by faulty nutrition which may be the result of the presence of the tubercle bacillus. The eyes of the patient should be observed. They may present two variations. They may be somewhat more lustrous than naturally as in the majority of early cases, in which the toxins of the microorganism have only slightly affected the patient. If the toxins are more abundant, they produce a depressed effect and the eyes look dull and wistful or sad. The sclera are often pale, much more often than the conjunctivæ are. The alæ nasi seldom give any signs, unless in nasal obstruction or in the advanced stages of the disease. Decayed teeth do not point to anything significant, but they may prove a contributing agent to the progress of the disease. The lips are occasionally parched, especially if there was a slow protracted course of slightly elevated temperature that escaped observation. In many cases the lips are either slightly cyanotic, as in chlorosis, or they appear anemic.

In inspecting the chest proper it is advisable to walk around the patient quietly and slowly several times and note the different shades on the chest walls during respiration. If necessary, the patient may be gently swung around on a revolving stool for better observation, and the points where the shades are deeper should be marked for a closer examination by the other methods.

The muscles of the neck, as they enter into the chest wall formation, may be found to present a slightly spastic condition on one side or the other; sometimes it may affect the whole of the platysma, but usually only a few fibres of the muscle. A thickened sternocleidomastoid is also a suggestive sign of the disease, and will point out the side affected. A visible enlarged gland in the supraclavicular fossa must not be overlooked, and the color of the skin in the fossæ will occasionally appear somewhat deeper.

The clavicle, even in the well nourished or obese individual, can be observed to be somewhat more prominent on one side. In emaciated or thin persons the outer third or the flat portion of the clavicle will be found to be nearer the horizontal plane on the affected side. The curved portion seems usually more curved. This is probably not always the case: it is simply less covered by adipose tissue and its curvature is more noticeable. The subclavicular fossa is slightly deeper on the affected side, due to integumentary and muscular changes on that side.

Diminished respiratory expansion of the chest is noticeable only when disease has slightly advanced. In early cases it may be noted only when the pleura is involved, and more so if it is the diaphragmatic pleura. The respiration may not be affected in rate, but sighing and the frequent taking of a deep breath may be noted. These points are suggestive; they probably constitute an unconscious attempt to compensate shallow breathing. The pulse rate in pulmonary tuberculosis, even during slight activity, is usually increased, and a pulse rate above 84 in the male and above 90 in the female should be looked upon with suspicion.

In conclusion I wish once more to emphasize that each sign by itself is of no special weight, but a number of them taken together are significant in the diagnosis of pulmonary tuberculosis, and if supported by the other methods of physical examination, they become all important.

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CARDIAC ARRHYTHMIA.*

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Cardiac arrhythmia is probably the most puzzling circulatory condition with which the general practitioner is confronted. On looking into the literature on the subject he is met with such terms as pulsus alterans, pulsus bigeminus, pulsus trigeminus, Reigel's pulse, pulsus paradoxus, auricular flutter, auricular fibrillation, and numerous other descriptive names, until he is practically lost, and is unable to apply these terms to definite clinical circulatory conditions with which he comes in contact almost daily.

In the study of cardiac arrhythmia it is necessary to consider the normal factors concerned in the production and maintenance of processes in the normal circulation. The heart with its pericardium, specialized muscle, and endocardium is to a great extent under the control of extrinsic nerve fibres, namely, the vagus or inhibitory, and the sympathetic or accelerator, and these are in turn subject to the control of the cardiac centre in the medulla. This centre is susceptible to various reflex effects coming from nearly all portions of the body. This is demonstrated by the increase in pulse rate on sipping water caused by reflex stimuli set up in the terminal filaments of the esophageal branches of the vagus; the change in the rate and force of the heart beat caused by reflex stimuli set up in the pulmonary nerves; the increase in pulse rate set up by stimulation of certain peripheral nerves, such as the sciatic and brachial nerves; the effect on the pulse rate caused by fear, anxiety, etc., together with numerous other instances. These help to prove that the cardiac centre is susceptible to various reflex stimuli. It is also susceptible to altered chemical composition of the blood, as shown by slowing of the pulse in jaundice, due to the presence of bile salts in the blood, or the acceleration of the pulse due to muscular activity which is probably caused by metabolic products in the blood. Physical conditions, also, have their effect on the cardiac centre, as evidenced by the slowing of the heart as the blood pressure rises in asphyxia, or the change in the rate of cardiac con-

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traction during change of position of the body, which causes in turn a change in the blood pressure supplying the cardiac centre.

Besides the nervous control the normal heart possesses certain properties, such as persistence of contraction after the nervous connections are completely severed as long as its chambers are kept filled with a certain chemical solution under proper pressure and at the proper temperature. This property of the heart is known as automatism. Cardiac muscle also possesses the properties of rhythmicity, or the power of responding to continuous stimulation by a series of rhythmically repeated contractions, and the power of coördination causing the various parts of the heart to beat in regular sequence. Since rhythmicity exists the heart must also possess a refractory period, which is a time during its cycle in which the stimuli are not responded to.

The vasomotor nerves, dilators, and constrictors, together with the elasticity of the vessel walls, are the main controlling factors in maintaining the proper equalization of blood pressure, and inasmuch as the cardiac centre and the pulse rate are subject to change with changing blood pressure, it can be readily seen that the scientific study of cardiac arrhythmia involves a careful consideration of the pathological conditions, bacteriological, metabolic, or physical, which underlie the particular change or changes in one, all, or any combination of the factors concerned in the production and maintenance of the circulatory phenomenon.

For the purpose of studying clinical cardiac pathology various instruments of precision have been invented, including the electrocardiograph, the polygraph, and the sphygmomanometer. The electrocardiograph is probably the most scientific instrument for this purpose at the present time. It depends for its action on the electromotive force set up in the contraction of the myocardium, causing a deflection of a string galvanometer which is photographed on a moving plate. The records thus obtained have been of inestimable value in the scientific study of clinical myocardial pathology, showing definitely by the alteration of its waves, auricular fibrillation, auricular flutter, origination of the wave of contraction, direction and deflection of the contraction wave, location of preponderant contraction, and the length of time between the contraction of various portions of the heart. In auricular fibrillation and flutter there is a marked increase in the number of auricular waves to a unit of time over the ventricular wave. Preponderant action is shown by the direction of the wave; by the direction and time of the wave it might be possible to determine the relative electromotive force set up in each side of the myocardium. The electrocardiograph is also susceptible to skeletal muscular contraction, such as muscular twitches, peristaltic muscular contraction, atmospheric electricity, etc., but these waves can be ruled out by compensation in the apparatus.

The electrocardiograph has demonstrated its efficiency in the study of these conditions, and will be of much more practical aid in the future when statistics can be obtained relating to the effects of various therapeutic measures directed against cardiac pathology. This instrument is not accessible to every general practitioner as yet, and much is to be learned of its scientific value in certain diagnosis and treatment. It is also possible that many new forms of arrhythmia and other pathological cardiac conditions will be elicited.

The polygraph is also a valuable instrument in the study of clinical myocardial pathology, and has revealed, when accurate tracings have been obtained, facts which are of great value in the diagnosis and treatment of certain myocardial conditions. It is sometimes impossible to obtain an accurate tracing with this instrument, particularly of the auricular activities, because in some individuals the arrangement of fat and muscular tissue over the jugular vein is such that an impulse is not produced sufficient to set up vibration of the air in the receiver and tubes and strong enough to influence the writing lever; again, in some cases the intravenous pressure is not sufficient to produce a tracing. Muscular twitches and carotid pulsations are frequently interspersed in the tracing, which make it very difficult to interpret properly.

The orthodiagraph or Röntgen ray measurement of cardiac outline, or a plain röntgenogram of the heart is very valuable; they show the relative size and position, the relation to other organs, and the evidence of hypertrophy or dilatation of certain chambers, together with gross changes in the immediate structures, such as aortic dilatation and other mediastinal conditions.

The sphygmomanometer is the only instrument which is accessible to the practitioner, and with it and palpation of the radial pulse, careful inspection, palpation, percussion, auscultatory percussion, and auscultation of the heart a fairly accurate diagnosis of cardiac pathological conditions can be made. By palpation of the radial pulse, the rate can be accurately determined, together with abnormalities of the rate, if the pulse is counted during two or three units of time of ten or any number of seconds to each successive unit, and the rate mentally recorded in each unit. By palpation of the radial pulse, together with auscultation of the apex beat, pulse deficit can be determined. In marked so called pulsus alterans the variation in the strength of beats can be discovered. By inspection of the cardiac region of the thorax the location of the apex beat can be determined, together with abnormal contraction waves due to hypertrophy or dilatation. In palpating over this area thrills and large bruits can be felt. By percussion, particularly auscultatory percussion, the size of the heart, together with hypertrophy or dilatation of certain chambers and pericardial effusion can be fairly well outlined. By auscultation valve lesions, murmurs and bruits, and other adventitious sounds can be heard and fairly well localized.

With the sphygmomanometer the systolic, diastolic, and pulse pressure can be determined, and from these the heart load, cardiac energy index, and the relation existing between the systolic, diastolic, and the pulse pressure can be at least theoretically interpreted and the cause of faulty relation suspected. In using the sphygmomanometer by the auscultatory method it will be noticed that on releasing the pressure after complete occlusion of the artery, if

the pressure is equal in all the beats, the arterial sound will be heard with equal intensity, even though the rate is not regular. If the pressure is less in some beats than others, the beats of greater pressure will be heard first and those of less pressure will be heard later.

It will be readily seen that by these simple methods of examination cardiac arrhythmia can be classified as follows: 1, cardiac arrhythmia of rate; 2, cardiac arrhythmia of pressure; and, 3, cardiac arrhythmia of rate and pressure. Heart block is the only arrhythmia left out, but it can be suspected if the pulse is permanently below forty-five to the minute, and the ventricle stops long enough to produce cerebral circulatory changes, which induce the periodical syncope occurring in these cases.

The cardiac arrhythmia of rate includes premature systoles followed by a pause which is or is not compensatory, some of the arrhythmias due to various toxic effects on the nerve supply to the heart, the various mechanical arrhythmias due to displacement of the heart from extracardiac thoracic conditions and from presence of conditions such as mediastinal tumors, accumulation of fluid in the pleural and pericardial cavities, etc., on the heart or its great vessels and nerve supply interfering with the proper emptying and filling of the cavities of the heart. The arrhythmias occurring during the convalescence of acute infections are usually of this type. The cardiac arrhythmia of pressure includes pulsus alterans, which is usually due to defective myocardial contraction and occurs as a rule in the later stages of cardiac disease, such as chronic endocarditis affecting one or more valves and accompanied by cardiac hypertrophy, and in the late stages of cardiovascular renal disease with beginning cardiac decompensation. The arrhythmia of pressure is usually considered a bad prognostic sign.

The cardiac arrhythmia of rate and pressure, or absolute arrhythmia, includes auricular fibrillation and some of the arrhythmias mentioned before. It indicates interference with the conductivity of myocardial contraction in some instances, together with myocardial pathology. It occurs also in the later stages of chronic endocarditis affecting one or more valves and accompanied by cardiac hypertrophy in which degenerative changes have spread to the myocardium. This arrhythmia sometimes occurs in hearts that are clinically normal as far as size, shape, and the valve sounds are concerned. The diagnosis of all these arrhythmias involves a careful study of the heart sounds, pulse rate, and blood pressure findings, together with examinations by the instruments of greater precision.

The etiology of these arrhythmias involves a careful study of the circulatory apparatus, using all ordinary methods of physical examination, together with a complete clinical history, a complete physical examination, x ray examinations, laboratory tests, and a careful insight into the patient's psychological makeup. These findings should all be carefully interpreted and theoretical deductions should be made regarding the possible presence of chronic toxemias which might set up pathological changes in the circulatory apparatus and its nerve supply. A theoretical interpretation of the various blood pressure findings should be made. The relationship of diastolic, systolic, and pulse pressure should be noted, which give some idea of peripheral resistance and cardiac force. A theoretical interpretation of the possible balance between the endocrinal secretions should be considered. In short, the entire field should be gone over and an attempt made to decipher the possible cause or causes of the condition, not only within the circulatory apparatus, but in the organism as a whole.

The prognosis of this condition is fairly well established in some of these arrhythmias. In the arrhythmia of rate due to temporary pathology in the heart muscle or nerve supply as a result of acute infections, the prognosis is good. In the persistent premature systoles with compensatory pause, a number of cases have been reported in which patients have recovered and suffered no ill effects.

The arrhythmia of pressure is considered a bad prognostic sign and occurs late in various chronic cardiovascular conditions, involving endocardium, myocardium, pericardium, and bloodvessels. Cases have been seen, however, of this form of arrhythmia following or occurring during the course of various acute infections which were only temporary. These patients apparently made a good clinical recovery. The arrhythmia of rate and pressure is of uncertain prognostic value, and the outcome, not only in this form but in all others also, depends largely on the response to treatment. While the prognosis in all these conditions is conceded fairly definite, yet it is always advisable to present the condition to a responsible member of the patient's family, so that future embarrassment to the physician may be avoided.

The treatment can be divided into general and specific. The general treatment involves a careful study of the patient's psychological makeup, his diet, his activities, together with a careful clinical deduction concerning the factors before mentioned regarding the extracirculatory conditions which might exist in an individual case. The psychological condition of the patient must be dealt with in a firm and diplomatic manner. The diet should be governed by extent of complicating lesions such as nephritis and various gastrointestinal conditions, permitting the patient foods which maintain nutrition as manifested by weight, but still keep him comfortable and with the least possible degree of intoxication.

The activities should be governed by the ability of the circulatory apparatus to compensate for certain forms of exercise or work. If with certain exercises the patient's pulse becomes too rapid or arrhythmic or he shows signs of slight loss of compensation, such as dyspnea and edema of the feet and ankles, the patient's activities must be cut down until the circulatory apparatus is able to compensate without embarrassment. The patient's extracirculatory condition must be carefully considered and various foci of infection and irritation should be relieved if possible. Gastrointestinal, genitourinary, and pulmonary conditions should have appropriate treatment, and a careful deduction of the balance between the internal secretions should be made and

the proper extract of these glands be given if possible.

The specific treatment depends on the proper administration of digitalis, atropine, strophanthus, and antiluetic treatment if indicated.

Digitalis in some form is indicated in nearly all the cardiac arrhythmias in which the pulse rate is rapid and signs of loss of compensation exist. It should be pushed until a marked slowing of the pulse is accomplished, and if one preparation does not seem to do this, another one or even a fresh preparation of the same one should be tried.

Atropine is indicated in cases in which the vagus nerve seems to be involved, due to various disturbances, such as gastrointestinal conditions which produce a reflex effect or various intoxications which might set up a vagus neuritis, altering the flow of stimuli passing through the vagus nerve to the heart. In fact, atropine alone or in combination with digitalis may be tried and in some instances will produce effects in cases in which no clinical condition is apparent indicating its use.

Strophanthin seems to have its best effects when administered intravenously in the dose of 0.02 to 0.01 grain. Remarkable relief in this condition has been reported by this treatment. Finally, lues should never be overlooked in these cases, and if demonstrated or even suspected, appropriate treatment should be instituted.

308 Diamond Bank Building.

MESENTERIC VENOUS THROMBOSIS FOLLOWING AN ABDOMINAL HYSTERECTOMY FOR FIBROIDS.

Report of a Case with Unusual Symptoms.

By M. Rabinovitz, M. D., F. A. C. S.,
New York.

Mesenteric embolism and thrombosis are not readily diagnosed, the main reasons being the varied nature of the symptomatology and the relative rarity of the occurrence. The clinical evidence of this pathological entity is at best only circumstantial, and often the true nature of the disease is not discovered until an operation or an autopsy has been performed. These facts, however, do not deter us from attempting to reach an approximate diagnosis, particularly in the early stages of the thrombosis when operative measures may be effective in about one third of the cases. A brief review of the symptomatology would therefore be desirable in order to illustrate the unique features of the case I wish to report.

The clinical varieties of mesenteric thrombosis. 1. Patients suffering from endocarditis, alcoholic, or syphilitic cirrhosis of the liver, or an arteriosclerosis of any origin, are susceptible to mesenteric embolism and thrombosis. The vessels affected in these conditions are usually the arteries, although the veins may be involved with equal frequency. The question whether the arteries alone, the veins alone, or both sets of vessels are obstructed is of purely theoretical value, for I doubt whether it is ever possible clinically to differentiate between them with any degree of certainty. Before the occlusion in the arteries becomes complete, these patients suffer for months or years from repeated attacks of abdominal cramplike pains which radiate to the lumbar regions and are accompanied by constipation, alternating diarrhea, and occasionally bloody stools. The pains are due to intestinal claudication, termed by Orthner (1) "dyspragia intermittens angiosclerotica intestinalis." Once the obstruction in the mesenteric artery has become complete, the above symptoms increase in severity, and the patient ultimately succumbs to the toxemia resulting from paralytic ileus with its classical signs of abdominal rigidity, tenderness, vomiting, obstipation, increased rapidity and weakness of the pulse, exhaustion, and finally death.

2. Venous thrombosis of the mesentery may be primary or secondary. The primary condition results from a septic phlebitis arising from an infection in the intestinal tract, in the vermiform appendix, or in the female pelvic organs following labor or abortion. The secondary type results from an obstruction in the portal vein, thereby retarding the return flow in its tributaries. The portal obstruction is due to extraneous causes, such as primary or secondary cancer of the liver, gummata, syphilitic perihepatitis, gallstones, or cancer of the gallbladder. The primary type of venous mesenteric thrombosis is of greater importance clinically because it occurs more frequently and because of its readier amenability to surgical treatment. In this type of cases there is as a rule a period of latency from a few days to several weeks intervening between the time of the causal infection and the onset of the symptoms. The disease is ushered in by an attack of severe abdominal pain, a sharp rise of temperature, an increased leucocytosis, repeated chills, and slight jaundice. As the disease progresses, and the thrombosis extends, the involved loop of intestine becomes paralyzed and the terminal stages of paralytic ileus, identical in nature to those observed in the arterial variety supervene. Some of these patients may be saved by an early operation consisting of resection of the thrombosed intestine with the corresponding obstructed bloodvessels, or resection or ligation alone of the infected veins.

3. This type of mesenteric thrombosis is met with in patients operated on for inguinal hernia with resection of part of the omentum, or for strangulated hernia; also after myomectomies, partial thyroidectomies, gastroenterostomies, or any operation involving the section and ligation of large bloodvessels. An analysis of the cases recorded in the literature reveals the fact that there existed no causal infection at the time of operation. The etiology of the thrombosis in these cases must therefore be assigned to mechanical causes whereby an aseptic embolus has been carried by the bloodstream from a remote region into the mesenteric veins. The symptoms in this group of cases develop either immediately after the operation and death takes place shortly thereafter, or after a period of latency of one or more weeks, after which the disease breaks out in full severity and then resembles the arterial type of thrombosis.

4. There is still another group of cases mentioned by Trotter (2) in which abdominal symptoms are

altogether wanting. The other symptoms are also indefinite and defy the diagnostic acumen of the most astute clinician. My case may with propriety be classified under this heading, and its atypical course makes its recording worth while.

Case.—Anna K., aged forty-two years, married twenty-two years, gave birth to a child twenty years ago, but has not conceived since then. Her menses began at the age of fourteen, regular in type, moderate in amount and painless. For the past three months her menses have been irregular and more profuse in amount. She is bleeding now. On September 26, 1916, she was taken ill with severe abdominal cramps localized in the epigastrium and radiating to the lumbar regions posteriorily. After twenty-four hours, the abdominal pains became more diffuse in character, grew less in severity, and were accompanied by pressure sensation in the hypogastrium. There was no vomiting, and her bowels have moved daily. Physical examination showed a well nourished woman, tongue moist, pulse fair quality, rate 92, temperature 99° F., respirations 24. Uranalysis was negative. Blood count: white blood cells, 12,400; polymorphonuclears, seventy-nine per cent.; small mononuclears, twenty per cent.; eosinophiles, twenty per cent.; hemoglobin, eighty per cent. Abdomen was enlarged, palpation revealed a smooth solid tumor, corresponding in size and location to a seven months' uterine gestation. Vaginal examination showed a small cervix, slightly lacerated, merging into the abdominal tumor with which it formed one mass. The base of the tumor was wedged into the pelvic fossa very tightly, rendering it almost immovable. The uterine annexæ could not be palpated.

On September 28, 1916, I performed an abdominal panhysterectomy and an appendicectomy. On entering the peritoneal cavity, the omentum was found to be adherent to the anterior surface of a large solid tumor which occupied the entire pelvis and extended upward to a level about three inches above the umbilicus. The omentum was separated from the underlying mass to its lowermost attachments where the adhesions were densest. It was then ligated and cut across. This procedure brought the tumor into full view and disclosed it to be a large uterine myoma. On exploring the tumor posteriorly, a few coils of the small intestine were found to be adherent to it. These were separated and a hysterectomy performed. The appendix was also removed, and the abdomen closed in the usual way without drainage. On her return from the operating room the patient presented evidences of moderate shock. Appropriate cardiac stimulation, and proctoclysis rendered gratifying results, and in a few hours her condition became very favorable. Towards evening her pulse rate was 100, and the temperature 101° F.

September 29.—Temperature 99° to 100° F., pulse 96. She vomited once, and complained of epigastric pain, and was restless. One dose of morphine and atropine was administered. September 30.—The temperature and the pulse were the same as on the previous day; the epigastric pain still persisted; the vomiting was a little more frequent and consisted of glairy mucus. The abdomen was soft, percussion over the left hypochondriac, and the epigastric areas failed to elicit signs of gastric dilatation. The tongue was moist, her cerebrum clear, and she rested at longer intervals and retained most of the fluids given her per os and rectum. She voided 400 c.c. of urine in the past twenty-four hours. October 1.—The temperature was 99° F., pulse rate 90; the pain in the epigastrium was less marked, but the vomiting was more troublesome; the vomitus was brownish. The bowels moved by means of an enema, liquid feces and a good deal of flatus were expelled. The tongue was moist and the facies was somewhat drawn. The abdomen was soft, and there was no distention and no rigidity; there was slight pain on palpating the lower part. She passed about 500 c.c. of urine in the past twenty-four hours. Analysis showed a faint trace of albumin and some granular casts. Lavage was resorted to. October 2d.—The temperature was 99° F., pulse rate 100. She felt much more comfortable during the night and during the entire forenoon. She retained most of the fluid nourishment taken. The bowels responded to enemas, particles of feces and a good deal of flatus were expelled. The patient appeared to be somewhat drowsy. Towards evening the vomiting returned with greater frequency and in larger quantities. Its character varied in color from a dark brown to a greenish tint and she complained of indefinite abdominal pain. The abdomen, however, remained soft and was not tender, and the tongue was moist. October 3d.—The temperature was 99° F.; pulse increased from 100 in the morning to 118 towards evening. The vomiting became almost incessant, and its odor distinctly fecoid, but the abdominal condition failed to show clinical evidences of obstruction, for it remained soft, not distended, and painless. The tongue stayed moist, and the bowels responded satisfactorily to enemas. In spite of a preponderance of negative clinical signs of intestinal obstruction, I decided to reoperate.

The peritoneal cavity was free from either serous or purulent effusions. The suture lines over the stumps of the broad ligaments and the appendix presented normal healing surfaces. On the left side of the adbominal cavity a coil of small intestine, apparently jejunum, for a distance of about nine inches, was purplish blue in color, distended to a diameter twice its normal size, with its corresponding mesentery hard and indurated. The rest of the intestinal tract was normal to inspection and palpation. No attempt to resect was made, owing to the precarious condition of the patient. The abdomen was closed, the patient returned to bed, and she died four hours later.

Epicrisis.—At the time of operation no active inflammatory process existed anywhere. The pathological conditions encountered were rather of a chronic type and were most likely due to pressure by the tumor upon the adjacent viscera. A primary focal infection can therefore be ruled out with a fair degree of certainty. The subsequent course of the disease, the absence of temperature elevations to any appreciable degree, the absence of chills and rigors, and the slow pulse rate, with none of the typical abdominal crisis characteristic of mesenteric thrombosis further tend to eliminate the possibility of a septic phlebitis. Furthermore, the absence of peritoneal involvement, as evidenced by the clinical signs and further substantiated by the findings at the second operation, lend additional confirmatory evidence of a nonseptic origin. Our conclusion must therefore be that the thrombosis was of a purely mechanical nature. The only clinical peg upon which we could have hung our diagnosis of mesenteric thrombosis in this case was the persistent vomiting. Whether this sign alone can be relied upon to clinch the diagnosis of mesenteric thrombosis is rather a rash statement to make. Few surgeons, I am sure, would care to reopen the abdomen in the face of so many negative signs as were presented by this case except as a last resort. Yet this case teaches the lesson that such exceptions are worth while bearing in mind, and that postoperative vomiting alone persisting in spite of lavage and open bowels with a soft abdomen should be a sufficient indication for an exploratory operation.

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1. ORTHNER: *Sammlung klinischer Vortrage von Volkmann*, January, 1913, No. 347. 2. TROTTER: *Embolism and Thrombosis of the Mesenteric Vessels*, Cambridge Press, 1913.

1261 Madison Avenue.

Superficial Atrophy of the Mucous Membranes of the Tongue and Mouth.—H. H. Hazen (*Journal of Cutaneous Diseases*, November, 1916) describes two cases of this affection which is characterized by a roughly oval, sharply circumscribed patch, with the long axis parallel to the tongue. The color is glistening white. There are absolutely no papillæ present. To the finger it feels like a surface atrophy. There is some impairment of sensation.

Our Readers' Monthly Prize Discussions

Twenty-Five Dollars Is Awarded for the Most Satisfactory Paper

All persons, whether subscribers or not, are invited to compete for the prize of $25 offered for the reply deemed best by the editors to the following questions:

CLXXXIII.—How do you treat excessive menstruation in the unmarried? (*Closed.*)

CLXXXIV.—How do you correct bad spelling and forgetting in children? (*Answers due not later than July 15.*)

CLXXXV.—How do you treat acute tonsillar infections? (*Answers due not later than August 15.*)

The award will be based solely on the value of the information contained in the answer. No importance will be attached to literary style. Answers should preferably contain not more than six hundred words, and should be written on one side of the paper only. All papers submitted become the property of the JOURNAL, and should bear the full name and address of the author for publication. The prize will not be awarded to the same person more than once within a year.

The prize of $25 for the best answer to Question CLXXXII has been awarded to Dr. Nathan Hirsch, of Brooklyn, N. Y., whose paper appears below.

PRIZE QUESTION CLXXXII.

INFANTILE DIARRHEA PROPHYLAXIS.

BY NATHAN HIRSCH, M.D.,
Brooklyn, N. Y.

The etiological factors in the production of infantile diarrhea indicate the prophylactic measures to be followed. Improper feeding is probably the most generally active cause of diarrhea in infants. When an infant is breast fed he is much less likely to suffer from diarrheal diseases than when artificially fed. Maternal nursing should therefore be encouraged by every possible means. A child at the breast should not be overfed or fed too frequently, as these may cause diarrhea by deranging the intestinal tract. Mothers should be instructed as to the general rules regarding intervals and length of feedings for the various months. These rules and tables will be found in all standard works on pediatrics. Weaning should better be postponed until after the summer months.

In artificial feeding, if the general rules as to the quantity of food, frequency of feeding, proper modification of cows' milk and all matters relating to the proper care of milk, careful supervision of dairies, the handling of milk in the cleanest possible manner, prompt delivery at home, and careful refrigeration after delivery are carried out, there will be little danger of diarrhea. Any condition bringing on indigestion, such as overfeeding, use of improper foods or impure foods especially impure milk, may be ranked as a cause of diarrhea and should be avoided. During summer, overfeeding is particularly to be avoided. It is a good plan during the hot days to diminish each meal of the infant by at least one half, making up the deficiency with water, and to give water very frequently in between feedings. All water given to infants or young children should be boiled. Infants cry more from heat and thirst than from hunger. Even those at the breast are likely to be given too much. Infants should be fed less frequently during hot weather.

Since pure milk, properly kept and properly given, is one of the best means of averting diarrheas of infants, an effort should be made and is made in most cities to supply such milk. After the adoption of milk stations in certain cities where pure milk and proper information as to the modifying and keeping of it were distributed especially among the poor the number of cases of diarrheas greatly decreased. The best milk to use for infant feeding is certified milk. It is milk which has been obtained from healthy cows, by healthy milkers, or clean machinery, in sterile receptacles, under sanitary surroundings and kept at a temperature of 40° F. or below constantly, and delivered to its destination as soon as possible, usually within twenty-four hours. The next best milk is pasteurized milk, which is heated to a temperature between 120° and 150° F. for twenty minutes, and then kept at a low temperature constantly. Pasteurization destroys some of the nutritive elements of the milk, but is not so bad as sterilization, which kills more bacteria but at the same time destroys much more of the nutritional value of the milk. No bactericidal agent should be added to milk. When the milk supply for the day is received it should be properly prepared according to the age of the infant, poured into as many bottles as the number of feedings necessary for the day and put on ice until needed for use. When the time for feeding is due the contents of one of the bottles is warmed and fed to the child. If the supply is short some other food as barley water or prepared food may be given until the supply for the day is received.

General hygienic considerations are also very important in preventing infantile diarrheas. Cleanliness of children, frequent bathing and proper care of napkins are important. In summer, napkins should either be washed immediately or thrown into a disinfectant solution, especially if the infant is suffering with diarrhea. The infant's mouth should be kept clean and the breasts of a nursing mother should be kept clean. In summer nights avoid exposure of an infant's abdomen and legs.

Cleaner streets and more parks, more air, more sunlight and less crowding in tenement homes and institutions would help to diminish diarrheas. In summer those who can afford it should go to the country with their infants. Day excursions do much good where a prolonged stay is impossible. Early and prompt attention should be given to all the milder derangements of the stomach and intestines. Prompt attention at the outset will avoid many serious attacks.

67 SUMNER AVENUE.

Dr. Joseph N. Zierler, of Baltimore, contributes:

Many factors contribute to the production of diarrhea of infants. Among them are improper feeding, excessive heat, sudden changes from hot to cold and cold to hot climates, contaminated milk, malnutrition, chronic disorders of indigestion, marasmus, rickets, impure water, poor hygienic surroundings, and the action of saprophytic and pathogenic organisms. The so called summer diarrheas do not differ essentially from those met with at other seasons of the year except that they are more frequent, more severe, and less easily controlled. In order to discuss the preventive treatment intelligently it would be well to consider briefly a classification. That given by Dr. McKee, of Philadelphia, is simple and satisfactory: 1, intestinal indigestion —acute or chronic; 2, fermentive diarrheas; 3, ileocolitis, or infectious diarrhea—acute, chronic, subacute or dysenteric; 4, cholera infantum. Intestinal indigestion represents the simplest form with little or no fever, the disturbing factors being proteid, fat, or carbohydrates. In fermentive diarrheas the saprophytic organisms are at work. In the third group various organisms, the Shiga bacillus predominating, while Bacillus pyocyaneus, streptococci and staphylococci, have been found. Cholera infantum is undoubtedly infectious; real cause is still uncertain.

With the advent of hot weather the general resistance of the infant is lowered. We note a diminution in the secretion of gastric and pancreatic juice which in turn leads to incomplete digestion of the food, and the intestinal contents become a favorable seat for the excessive growth of saprophytic bacteria and in due time to pathogenic organisms and direct infection of the intestinal tract. It seems plausible, therefore, in cases of mild forms of acute intestinal indigestion, to reduce the strength of the food in order to bring it within the digestive capacity of the diminished secretions. In the fermentative type ridding the intestinal canal of the abnormal products of digestion by free catharsis will prevent in a great number of cases the infectious types. Intelligent supervision of the child's clothing and hygiene is important. In very hot weather the child should be lightly clad and even kept indoors, if a cool, shady place outside is not available. Cold sponging with water or equal parts of water and alcohol at a temperature of 85° F. and fanning may be carried out during the hottest hours of the day. A change of climate, away from the city to the country or seashore is desirable.

Breast fed infants will come through the hot summer months if such simple measures as cleanliness, fresh air, regularity in feeding, and quiet are observed. The importance of maternal nursing is obvious and should be encouraged. In over ninety per cent. of cases of summer diarrhea the artificially fed infant is the one attacked. The importance, therefore, of proper mixtures of percentage feeding and the supply of a pure, uncontaminated milk becomes obvious. The infant who is fed on a proper formula, gaining steadily, and who is free from gastric disturbances prior to the advent of hot weather, will in the majority of cases come through the hot summer months with very little disturbance. On the other hand, an infant carelessly fed on patent foods or unsuitable modifications of cow's milk will in the majority of cases fare badly. The high mortality among infants from diarrhea is undoubtedly among this class of carelessly and unscientifically fed cases.

Milk intended for infant use should be thoroughly supervised by the health authorities and should conform to a certain standard. During the hot months the milk should be pasteurized or sterilized, bearing in mind, however, that neither process will render inert the product of bacterial growth in a dirty contaminated milk. The proper handling of the milk after it reaches the house should be impressed upon the mother. It is remarkable how often some of the worst cases of diarrhea will show rapid improvement when put on a suitable formula of clean pasteurized milk. Intelligent feeding and the proper milk supply, therefore, cannot be too strongly emphasized as the most important prophylactic measures at our command. A bottle fed infant should be placed on a proper formula of percentage feeding, from the very outset and remain under the supervision of the physician throughout the nursing period, the formula to be changed from time to time to meet the individual requirements. The directions to the mother for the preparation of the mixture should be simple and explicit, and the physician should satisfy himself that his instructions are carried out thoroughly.

Dr. Joseph H. Marcus, of Atlantic City, N. J., says:

Of prime importance in the prophylaxis of diarrhea, are the following regulations: The child should not be weaned during the summer months; encourage the continuance of maternal nursing, and adopt measures to make this possible. Instruct mothers on matters akin to artificial feeding. Insist upon the use of pasteurized or sterilized milk during the summer. Good milk can be supplied to those who are too poor to afford it. Artificially fed infants should be watched carefully either by visits to the home or in the milk station. If certified milk cannot be obtained, the best that can be had should be pasteurized and kept cold until feeding time. Insist upon scrupulous cleanliness of bottles, nipples, etc. Do not give food in too large quantities or of a sort not adapted to the age and condition of the child. Feed at regular intervals, and do not permit the too early and too frequent use of of table foods. Boil all water given to infants.

The following hygienic measures are of great help in the prevention of diarrhea: Whenever possible city children should be sent to the country or seashore for the summer months; where a prolonged stay is impractical, daily excursions should be practised. Keep them out of doors as much as possible and do not allow too much walking; clothing should be light and consist of one piece. A very small percentage of cases may be due to some disturbance in the mother, during lactation, such as pregnancy, tuberculosis, syphilis, etc., or a prolonged nursing with deficient fats and proteins.

Medicine and Surgery in the Army and Navy

THE COLUMBIA WAR HOSPITAL.

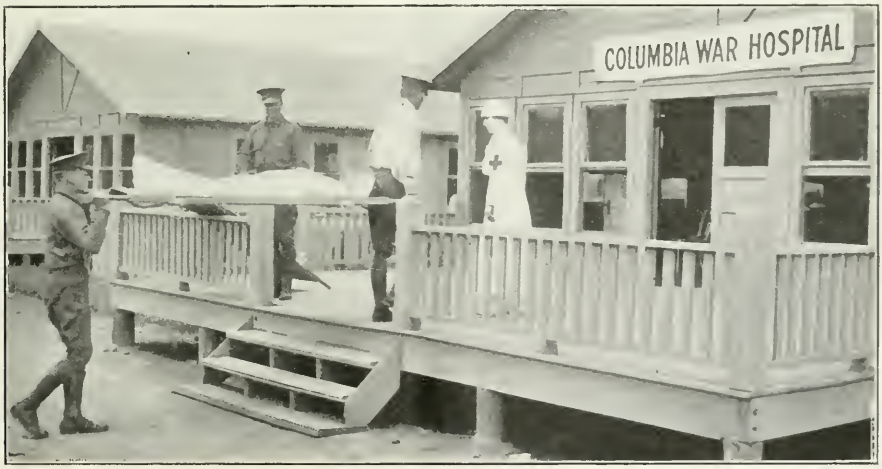
By Francis Carter Wood, M. D.,
New York,
Director of Cancer Research, Columbia University.

The proclamation of the President that a state of war existed between Germany and the United States found this country largely unprepared to fill the contract which it had undertaken. Indeed, the extent of that undertaking is not at all realized even yet by the public, and the shrewdest and most farseeing public men are still unable to compute to what lengths we may ultimately be led. There is, however, a complete realization that war at the present time has ceased to be a matter of personal valor or of muscular strength in the individual soldier; the muscular strength in this war is supplied far more by those who labor in factories than by the proportionately small number who fight battles. It is estimated that seven times as many people work for the war behind the lines as in the trenches; war has become a question largely of munitions and food and is conducted to a great extent by machinery.

In another way the lessons of the wars of the last fifty years have brought home the fact that the preservation of the health and life of the soldier is just as important as is his military training, for in recent campaigns many more men died from disease than from bullets. As a result of these lessons, the position of the medical officer has greatly altered in the last ten years. Instead of being merely contract physicians, whose advice to the commanding officers may be interesting but need not necessarily be followed, the medical officer now ranks with officers of the line and exercises powers which he never before had. Today every death from typhoid fever is a criticism of the efficiency of the army management, and it is realized also that a large percentage of those injured by missiles can be saved, either to return to the battlefield or to lead useful lives in peaceful occupations.

These conditions, together with the great increase in destructiveness of the various instruments of warfare, have led to an extraordinary demand for physicians and for space for the treatment of patients. At the beginning of this war the number of physicians available was extremely small, but nearly 6,000 have since volunteered their services for the needs of their country. Some have already been sent abroad for work in the base hospitals to relieve the hard pressed medical men of England and France. Others will have to serve with the troops in dressing stations, that is, under fire, and must, therefore, know a great deal about modern warfare —the handling of arms, trajectory of projectiles, construction of bomb proofs in which the wounded may be dressed, and reading of maps, in order that they may understand the general position of the troops and the trenches and the best methods of approach to the wounded under fire.

At the time of the President's proclamation there were in this country few facilities for the instruction of medical officers. In a democracy, however, the people must always stand by the government which they have created, and, fortunately, the present administration has welcomed the aid which the citizens of the republic have freely given. The formation of the Council of National Defense with a medical section is a concrete illustration of this fact. With



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Columbia War Hospital receives its first patient. The remarkable celerity with which this, the first war hospital in the United States, was erected and equipped is shown by the fact that only thirty days elapsed between the time when the first lumber was delivered on the ground and the completion of the buildings ready for use.

our entrance into the war, necessitating the sending of our troops abroad, and, consequently, the care of the wounded who will be returned to this country on the homeward trip of the transports which carry the troops over, the shortage of general hospital facilities for the army has become most evident. Most of these returning transports will dock in New York, and so attention must be given first to the local conditions here.

Ten years ago, a survey of the hospital facilities of New York city was made, with the result that we were found to lack one thousand beds of the number necessary to care for the normal needs of the lay population. In the realization of this condition, a small group of physicians was called together in the latter part of March by Dr. J. Bentley Squier, of Columbia University, who laid before them a plan for the construction of a base hospital in New York which was to provide accommodations for the overflow from other hospitals, for accident cases, and, when the need came, for wounded soldiers. As finally developed, the scheme also included opportunities for the training of physicians in military medicine, of nurses, orderlies and stretcher bearers, and of other members of the necessary personnel of a base hospital. This plan was formulated on March 31, 1917, and was presented to Dean Lambert, of the College of Physicians and Surgeons, and to President Butler, of Columbia University. On April 2d, Doctor Butler brought the proposition before the trustees of Columbia at their regular meeting, and obtained, as Columbia's contribution to the plan, their approval for the use of the plot of nineteen acres on Bainbridge Avenue and Gun Hill Road, known as Columbia Oval and long owned by the university. This plot is on high ground, opposite the large buildings of the Montefiore Home; was already provided with sewer, water, gas, and electricity facilities, etc.; is accessible from two subway routes and from the Harlem and Putnam divisions of the New York Central and is but a short distance from the Harlem Ship Canal. This last is an especial advantage, because if troops are brought from abroad they can be transferred from the transports to small river boats and thus carried close to the hospital, to which they can easily be taken by automobile ambulances.

This plan was published on April 3d in the columns of the New York *Times*, together with President Butler's appeal to Columbia to do what she could for her country. The same evening Doctor Squier received from Mrs. B. Van Gerbig a check for $10,000, and the next morning a check for the same amount from Mr. Daniel Guggenheim and one from Mr. William H. Woodin for $1,000. Mr. Woodin also offered to place his office staff at the disposal of the committee to handle any further funds which might be received, and he was thereupon asked to take the treasurership, which he very generously consented to do. Encouraged by this extraordinary response to the suggestion of the need for preparedness for the medical and surgical defense of New York, President Butler appointed a committee to carry out the plan, its membership being extended ultimately to include Dr. Samuel W. Lambert, Dr. J. Bentley Squier, Dr. Francis Carter Wood, Dr. William H. Bishop, Dr. A. V. S. Lambert, Mr. Frederick A. Goetze, treasurer of Columbia University, and Mr. Willard V. King, a trustee of the university. This committee has been greatly assisted by Mr. W. B. Osgood Field, who has accepted the post of quartermaster to the hospital.

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Columbia War Hospital. The kitchen of the hospital, showing the dishwashing and sterilizing machine to the left.

After deliberation, it was decided to construct a portable base hospital, not only because the neces-

sary buildings could then be rapidly assembled and quickly and easily removed when the war is over so as to leave the Columbia Oval unencumbered for the future development of the Medical School, but also because such a hospital would act as a model for training men who are to work in similar institutions elsewhere. The plans finally adopted were a composite not only of the work of the committee, but also of much preliminary study by Dr. Sidney R. Burnap and Dr. A. V. S. Lambert, of the Red Cross, by the architect, Mr. Charles Butler, and by Mr. Walter Bloor of the United States Realty Company. The last named and Mr. Arthur Nesbit, vice-president of the Fuller Construction Company, most generously volunteered their services in supervising the construction. The practicality of the scheme attracted a number of gifts, including one notable donation of $175,000 from Mr. Daniel G. Reid through his friend, Dr. Alexander Lambert. The support and interest of an advisory committee of public spirited citizens was quickly obtained, and approval of the scheme was secured from the War Department, the Surgeon General of the Army, the Mayor of New York, and the chairman of the Mayor's Hospital Committee, Dr. S. S. Goldwater.

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Columbia War Hospital. Corner of one of the wards.

As finally adopted the plans for the institution called for thirty-eight buildings, of which the operating room, laundry, kitchen, and receiving and supply building are constructed of light weight steel so as to avoid risk from fire. These buildings are provided with a large number of ventilation cowls in the roof, so that they will prove exceedingly comfortable even in hot weather. The wards, mess rooms, and buildings for nurses and orderlies are of wood and are entirely portable. It is estimated that with a sufficient amount of unskilled labor the entire hospital, covering ten acres, can in three days be taken down and packed in the sixty box cars which brought it to New York, and this without any damage which would prevent its being erected on another site. Although but three months have elapsed since the idea was first conceived, nearly half of the plant is already erected; the laundry and kitchen apparatus is installed; the operating room equipment and x ray machine are waiting and ready to be placed in the building, and it is probable that by August 1st the institution will be ready to receive patients. The committee has prepared lists of the medical personnel necessary to run the hospital, and plans are being formed to provide the various helpers, engineers, and others who will be needed for the final organization. A number of ambulances have already been donated by generous friends.

The whole is a splendid example of the prompt response which the American people make to a call, once they are convinced of its important need. Although the committee has at no time made a formal campaign for funds, yet up to the present time over $260,000 has been given, and there is a promise of more if need arises.

The most efficient way in which this building can serve the country is through a connection with the army, and it is probable that the War Department will join with the executive committee in the operation of the Columbia War Hospital. Just what the conditions will be under which this combination will be effected is not at present settled. The sudden change which has come in the situation, owing to the Government's recent determination to send a considerable body of troops to Europe and the actual appearance of a good many thousand soldiers of the United States Army in France has greatly

altered the circumstances which existed when the idea was first formulated. The Mayor's Committee has arranged for an increasing number of beds to accommodate the civilian overflow and also a certain number of wounded soldiers. This provision may be sufficient under fairly normal conditions, but it is evident that the determination of the army to bring back to New York as many wounded as can be transported has added great difficulties, and it is necessary for the army to have a distributing hospital in New York city, in which the wounded can be assembled, studied, classified according to the conditions found, and then redistributed to special hospitals or regular Government hospitals for convalescents. If five hundred wounded soldiers were to be landed in New York some morning, the only place where they could be cared for would be the Columbia War Hospital, for at present the public and private hospitals of the city are full. It is likely, therefore, that the Secretary of War will decide to take over the Columbia War Hospital, and that its name will then become, for official purposes, General Hospital No. 1, but it is to be hoped that even under its new title it will continue to fulfill all the functions for which it was planned by the small group of physicians who have tried to do their bit for their city and for their country.

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Columbia War Hospital. Doctors examining the icemaking machine. Colonel Edwin, Medical Department of the British Army, is talking to a lady at right.

The Medical Service of the United States in the War.—Dr. Karl Connell, who lectures on military surgery at the College of Physicians and Surgeons, served as a major, Medical Corps, National Guard, New York, on the Mexican border. He has been in charge of the Medical Section of the Military Census of New York State, and served half a year in the war zones of France, Germany and Austria in 1914-1915. In the *Columbia University Quarterly*, June, 1917, he reviews as follows the work in medicine and surgery done by Americans on the fields of Europe during the present war.

Great as seemed to us the outpouring of substance and of relief effort in hospital contributions, surgical units, and floods of dressing supplies, yet in proportion to the enormity of the demands, the material total has been so small as to be almost negligible. Of the total world's casualty list of some fifteen millions, America has brought material medical service to about one in seven hundred, and of the total medical burden of the warring nations she has borne not a two thousandth part. These proportions are analyzed not in the spirit of selfdepreciation, but to impress on the American mind the enormity of the medical problems which we now face. Small up to the present as has been the medical relief proportionally, yet this relief has become a future asset of incalculable value.

To analyze these efforts of the past and to apply them to the present developments, a few concrete examples suffice. The best example of a civilian hospital brought into existence in war emergency is the American Ambulance in Paris.

Through army influence, an unfinished beautiful high school was commandeered, in a suburb of Paris over the protest of the citizens of that community, and by American energy was rushed to completion. In the face of the great apparent need, however, this hospital, like the bulk of the sixty thousand beds in Paris, lay idle. The civil relief agencies of Paris clamored for wounded; but the cold military situation demanded that the capital be kept cleared of wounded, as in theory any armed camp should be. Then came the battle of the Marne, and the in-

vader was turned back. A sudden flood of wounded overflowed the channels to the south of France and seeped past the barriers into Paris. So the real war activities of the American Ambulance began when theory was overwhelmed by actualities. From then on the work broadened, and this hospital became the most widely known of all the American relief agencies. Similar institutions in Munich, Budapest and Petrograd served humanity well when they did their emergency best with the skill and material at hand.

Turn now to the local relief agencies of the American colonies in the warring countries to the Red Cross of yesterday. The war had scarcely broken out when the International Red Cross sent out its call for aid. The American Red Cross sounded a local call, and wherever possible it gathered groups of doctors and nurses. These were hastily equipped and organized and were dubbed complete units. By the relief ship load these units were distributed to the capitals of Europe, to take their pictured place on the battlefields. But the days of waiting lengthened into weeks and the units remained unassigned Gradually the knowledge dawned on these units and on the organization behind them that the cooperation of war demands nothing short of the highest skill and that units untrained by cooperation in peace have no place in the work of war.

The hospital and university units were the next stage of development in our relief efforts. In October of the first months of the war, ex-Ambassador Robert Bacon came home on a flying trip for financial aid and medical relief. The first friend he approached furnished the financial aid, and Columbia University furnished the medical relief. Thus, with the donor, Mrs. Harry Payne Whitney, a group of the teaching staff of the medical school of Columbia University, and a group of nurses from allied hospitals, a party under Dr. Walton Martin, professor of clinical surgery, sailed on the *Lusitania* early in November, 1914. After a hard schooling in Paris as to what difficulties of purchase and equipment the surgery of war may involve in a country so disorganized by invasion as was France, this unit was finally linked with the French sanitary scheme and established a useful work in the town in Juilly, serving the general battlefield of the Aisne. With this as an example, the later units came better equipped: units from the medical schools of Harvard and Pennsylvania, and units from the universities in Chicago, Baltimore, and Cleveland. These units, together with those from the French and German hospitals of New York, found a hearty welcome and rendered most acceptable relief to the countries where they were assigned. Thus by rendering organized relief through units trained together in the surgery of peace, a real service was rendered to Europe, and a real lesson came to America, namely, that she must prepare in time of peace for the surgical work of war.

A more individual achievement was contributed to the Balkans in the summer of 1915. Cooperating in a notable expedition, Dr. Hans Zinsser, professor of bacteriology at Columbia University, was sent with a corps of assistants for the study and control of typhus, a disease then ravaging Serbia. This unit worked in the wake of an efficient English relief expedition, and rendered signal service.

Into the research side of the war the Rockefeller Institute sent to France one of her most brilliant workers, Dr. Alexis Carrel, who set as his goal the sterilization of wounds. As a coworker with Carrel a brilliant physiological chemist, Doctor Dakin, was sent; he set himself a chemical and physiological problem of finding a substance highly destructive to bacteria yet not harmful to living animal tissue. The fruit of their work, the Dakin-Carrel method of wound sterilization, is one of the real surgical achievements of the war. America has already accepted this treatment as of sterling value, and many hospitals of New York have begun the routine application of this method to their everyday accidents.

The medical lessons of the war in preparation, organization and more preparation have not been neglected. While the United States Government was sending over military observers, a single officer to each nation, the medical profession was sending over observers by the scores. Some three hundred medical workers have reported their observations; and the reaction on America has been far reaching. The Red Cross, efficiently reorganized, has become a regular auxiliary of our small but efficient army medical service. On the basis of the lesson learned, the Red Cross has organized around each great hospital and teaching centre a series of base hospital units, of which Columbia University and allied hospitals have organized four. These are now completed, ordered to be ready for service, and, before this goes to press, may be serving on the fields of France.

An army without an efficient medical department is defeated by disease before it ever meets a human foe; and wound repair constitutes a large part of military activity. The medical profession is therefore represented on the war council of the nation by an organizing genius, Dr. Franklin H. Martin, serving as a member of the advisory commission on the Council of National Defense. From the council the medical preparedness efforts ramify through State and county committees down to the individual doctor, who in turn is putting his house in order awaiting the call to service. The proportion who must serve for each million men called to arms is equivalent to one doctor out of each fourteen in this country. Of the 15,000 doctors in New York State, a thousand must answer the first call. If we are to put an army in the field of decisive power, one doctor out of every three must serve the colors.

In order to develop the resources of New York orderly and efficiently without the waste motion of the volunteer system, a special medical census has been completed by the adjutant general of this State. Each doctor in the State has been sorted to his place. The lists show the younger men below thirty-five years of age who should serve with the marching troops, and the specially qualified groups from thirty-five to fifty-five who should man transports and war hospitals. These lists are prepared, classified, and await the call of a great leader who shall demand of the medical profession, as of every man, just and equal service toward victory of democracy.

Correspondence

MEDICAL NEWS FROM WASHINGTON.

Chief Pharmacists Appointed Assistant Surgeons in the Navy—New Work in Health Protection of Troops in Cantonments—Studies of Drug Addiction in Enlisted Force—A Department of Social Hygiene—Recommendations for Medical Officers' Commissions.

Washington, D. C., *July 9, 1917.*

The following chief pharmacists of the navy have been appointed assistant surgeons in the navy for temporary service during the war: Edward R. Noyes, Oscar G. Ruge, Charles E. Alexander, and Stephen Wierzbicki, of Washington, D. C.; Richard F. S. Puck, of San Francisco, Cal.; Howard E. Sausser, of Annapolis, Md.; Laurence O. Schetky, of Philadelphia, Pa.; Paul J. Waldner, of Olney, Pa.; Maury D. Baker, of Wilkinsburg, Pa., and Carl B. Furnell, of Wilton, Me.

Important new work has been inaugurated by the surgeon general of the army with a view to the protection of the health of troops at cantonments and those with the expeditionary forces in France. Colonel George E. Bushnell, Medical Corps, recently in command of the general (tuberculosis) hospital at Fort Bayard, New Mexico, and recognized as an authority on tuberculosis, will have charge of matters relating to that disease in an effort to establish such sanitary regulations as will prevent the admission to the military forces of men so afflicted and avoid the dangers of communication. Colonel James B. Glennan, Medical Corps, has charge of the supervision and maintenance of hospitals of the camps.

Lieutenant Colonel Frederick P. Reynolds, Medical Corps, has charge of the sanitation of the camps. Lieutenant Colonel Edward L. Munson, Medical Corps, has general charge of the training camps for medical officers, four of which have been established, at Fort Oglethorpe, Ga., Fort Benjamin Harrison, Ind., Fort Riley, Kans., and Leon Springs, Tex., where a large number of medical reservists already are under instruction.

Medical officers of the army and navy are continuing investigations on the subject of the prevalence of the drug habit among the enlisted force. Some important observations as a result of studies of drug addicts are made by Passed Assistant Surgeon Walter A. Bloedorn, of the Navy Medical Corps, who suggests a procedure that would decrease the availability of the drugs. He finds that heroine is the drug that lends itself particularly to the formation of habit and that the menace of heroine is growing; that a large percentage of the addicts begin the use of drugs in early adult life or while they are still minors, and that an addict has a tendency to spread the evil and thus is a menace to his associates. He says that drug addicts cannot be placed in the class with mental defectives. The availability of the habit forming drugs constitutes one of the chief reasons for their use, and the solution of the evil does not rest on the administration of any specific or cure, but rather on the removal of the underlying causes of which the drug addiction is merely an expression. Doctor Bloedorn recommends the following as a help in the general campaign against drug addiction: 1. Predisposing causes should be removed as far as possible, such as overcrowding, insanitary surroundings, the lack of facilities for healthful recreation, and the prevention of contact with drug addicts. 2. The aftercare of drug addicts following discharge from hospital is considered highly desirable, as a long change of environment, country life, or a change of residence to avoid old associates would help to decrease the number that return to the use of drugs following discharge from hospital. 3. Facilities for building up these men physically before throwing them on their own resources would be desirable, as many are physically unable to secure and keep employment immediately following the discharge. 4. All habit forming drugs, their manufacture, distribution, sale, and importation, should be controlled by the Government.

One of the most important provisions for the protection of health and morals of the members of the enlarged military force to be employed at the various cantonments is that of the creation of a Department of Social Hygiene under the auspices of the Council of National Defense and in general charge of Colonel L. Mervin Maus, Medical Corps, retired. It is proposed to maintain such conditions within the zones of protection prescribed in the vicinity of the cantonments as will protect the men from the consequences of dissipation and evil associations. This will be accomplished by the aid of the science of moral prophylaxis, a system approved by the Secretary of War, and, with similar purpose, for naval camps by the Secretary of the Navy. It is expected that it will be possible to enlist the assistance of members of the civil communities, men and women, who will contribute as much as possible to the welfare of the soldiers, not only by agreeable and helpful association, but also by reporting to the authorities the presence of those persons whose intent and influence are harmful. Of course, the municipal and State health authorities will be called upon to aid in this good work, and it is desired to effect a hearty and harmonious cooperation between them and the federal authorities. By this means it is hoped to maintain a condition that will be of benefit, physically, mentally, and morally. The project is of substantial dimensions, and the details remain to be worked out through boards of citizens and officials. It is intended that in the end soldiers will be surrounded by all the measures to defeat the agencies of dissipation and immorality.

Since the war began, the surgeon general of the army has recommended 9,637 physicians for commission as medical reservists; and many of them have been commissioned and ordered to active service, preference being given to those who are less than forty-five years of age. About 200 members of the profession are being recommended for commission in the Medical Reserve Corps every day. About ninety candidates qualified in the June examination for appointment as first lieutenants in the regular Medical Corps of the Army. About 235 candidates qualified in the June examination for appointment as assistant surgeons in the regular Medical Corps of the Navy.

Editorial Notes and Comments

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WAR AND DUTY: HOW SHALL THE PHYSICIAN DECIDE?

This war, so different from every other war, has completely altered the face of the old chivalric ideal. Heroic rush to arms must give place to a calculating sense of duty which demands courage of a no less robust and enduring fibre. This must be the attitude not alone of the citizen who has much to offer his Government, but as well of the Government, which must employ its complex forces and conserve them for the most effective onslaught upon the enemies of peace and the most complete building up finally of that world peace at which it aims.

Time was when the Connecticut farmer could leave his plow in the furrow, saddle his horse, and join his country's defence. The duties and responsibilities of civilized communities have increased marvelously since that day in number and in intricacy and demand for skilled training and resource. The spirit in the medical profession as elsewhere remains the same and would answer to the same impulse to shoulder the kit of tools and make for the front. Slackers are not found within the profession most stimulated by pressing need and absorbing interest to serve its fellowmen at all times and under all circumstances.

There is, however, no profession more thoroughly trained nor more conscientiously impelled to consider the question from the hard matter of fact side. It is sobered by the magnitude of the task which it shares in the greater government problem of offence, defense, and conservation of forces for war and for subsequent peace. Twenty thousand medical men are needed now to serve not only at home, but to take up their station at the front, which is no longer a protected zone. There are numbers who will not return. There is therefore an equally important consideration to be given to the home side of the question. No physician may answer the call to military service without duly pondering several things. It is not amiss to refer to a searching examination into one's own motives, for with this physicians are more and more confronting their patients in their therapeutic duties with them. Some insight into the psychology of the impulsive response to go or the too calculating decision to stay might set both right. Is some secret personal wish skulking behind an apparently commendable adherence to duty, making it merely egoistically easier to slip away from exacting claims at home or rendering it impossible, on the other hand, to leave one's position here? Slackers, no; but secret human motives conceal their strength behind the most plausible of rationalizations. Or is each physician facing the situation in the clearest light of reasoning, endeavoring to his utmost to comprehend the full extent of the burden falling so largely at this time upon the medical men? It is here that the Government too must approach the matter with a clear and sane grasp of the whole situation. The drafting of physicians upon a medical census is being urged in Washington on the ground that there is a shortage of volunteers and that the indiscriminate volunteer system is "sure to result in confusion, waste, and failure."

Too much emphasis cannot be laid upon the necessity on the part of the physician desiring to volunteer to consider well where his duty lies, nor upon the Government's evident duty in the matter. Indiscriminate drafting would certainly be no safeguard against "confusion, waste, and failure," but a middle course, whereby a just and wise selection of physicians should be made, would help each individual to solve his problem. It would also appraise the country's medical resources both for service abroad and for the equally important maintenance of practice at home, and a distribution of the

same more in accordance with the partial depletion of medical resources which must take place.

Physicians, too, have their family duties, social responsibilities, and in many cases large practices where they and they alone are needed to carry on their particular branch of work. There must be sacrifice in the case of every one who goes, personal sacrifice and loss to his clientage here. Nevertheless this loss should be on some basis of selection and adjustment. The welfare of the nation is bound up in the health of the people. So also is the future of the army. A third class, moreover, will all too soon be added to the physician's care at home, the maimed and crippled in mind and body whose "rehabilitation and reeducation" for the business of living will be an important medical task of the near future.

A SPECIAL INVESTIGATION INTO THE POLIOMYELITIS EPIDEMIC IN NEW YORK IN 1916.

Although cases of poliomyelitis have been reported through the winter and spring in every issue of the Department of Health bulletins, the condition has kept well within the average endemic status. Apparently we shall go through the summer without a repetition of last year's experience. The bacteriology and many other causative factors are still unknown, but a practical procedure in a future crisis can now be worked out and can be followed with a reasonable degree of confidence. On July 17th last year a committee appointed by the Mayor and supported by the Rockefeller Foundation began work "to cooperate with the Department of Health in combating the epidemic of poliomyelitis prevailing in Greater New York in the summer and autumn of 1916." Under the medical directorship of Dr. Alvah H. Doty, a field force of doctors and nurses pursued investigations into the sources of infection, methods of transmission, and the incubation period of the disease, by tracing contacts and undiagnosed and suspicious cases, and reporting new and hitherto undiscovered cases to the Board.

An incidental and extremely important result of this investigation was to disprove several conjectural theories of infection. In accomplishing the positive phase of the study, nothing new was discovered. Personal contact, the classical and the commonest mode of transmission, it is concluded in the official report, is the means by which poliomyelitis is spread, and slight and nonparalytic, or abortive, cases are the most frequent sources of infection. Of great value is the elimination of false theories. The medical director reports that there is no evidence to prove that the disease is transmitted by food, especially milk, by cats, dogs, chickens, rats, flies, fleas, mosquitoes, etc., or by clothing. In this knowledge workers in this field will be getting on firm ground. False theories in such a terrible emergency are like quicksands swallowing up young life. Valuable time is wasted in guesswork and speculation as to causes exposes more and more victims to the disease. While attention is directed toward futile procedures in a vain attempt toward protection, the disease makes headway and panic begins to run riot. Doctor Doty's report shows evidence of a thoroughly scientific procedure and a constraint in assertion that encourages confidence in his statements. The value of a study of this kind is entirely dependent upon the openmindedness of the investigator, his keenness of observation, and powers of deduction. Such a study requires detective powers of no mean proportions, and the ability to get at the truth in the face of ignorance and deceit on the part of those who will benefit by this work. This special report, in conjunction with the monograph on the Epidemic of Poliomyelitis in New York in 1916, published under the direction of the Department of Health of New York City, contributes important material on the practical public measures that may be depended on in a crisis.

A RED CROSS FRANKENSTEIN.

We learn from the *Army and Navy Journal* of recent date that to facilitate the work of the Red Cross officials, other than those incorporated in the Army Medical Corps, who thereby cease their connection with the Red Cross, they are to have a corresponding military rank appropriate to their titles in the scheme of the Red Cross organization. Officials will receive commissions, employees will receive warrants, and laborers, cooks, and privates will receive certificates of identity as enlisted men. Titles and duties are prescribed as follows: chairman of the war council to have the assimilated rank of major general; war counselor and vice chairman of executive committee, brigadier general; director general in charge of civilian and military relief, colonel; assistant director general—commissioner to the theatre of war, or bureau head—lieutenant colonel; director—bureau chief Red Cross representative at headquarters camps, base hospitals, supply depots, etc.—major; assistant director—Red Cross representatives with any lesser army detachment—captain; assistant director—storekeeper, adjutant or quartermaster aid—first lieutenant. Other assimilated ranks are as follows: secretary—clerical work—sergeant major; and at base hospitals, corresponding to army grade for Red Cross, master hospital sergeant, hospital sergeants, sergeants first class,

corporals, cooks, privates first class, privates, and laborers.

It is hardly conceivable that the War Department would formally authorize that for which there is no warrant in law. As far as we know, no authority exists for applying the grades of the army to civilian employees of the Red Cross any more than of the Navy or of the hierarchy of the church. To be sure, the Red Cross, within the limits of its charter, can organize itself as it pleases, and organization is necessary; its officials can call themselves kings, dukes, or gold sticks and make their rank correspond with princes and potentates if it so pleases them. But the use of the grades of the military bodies and the exercise of authority which such designation implies and invites requires an enactment by Congress which we trust will never be made.

By this time almost everybody knows something of the origin, object, and scope of the Red Cross. It is essentially a civilian organization to act as an auxiliary to the Medical Department of the forces; its functions in their original conception are wholly supplementary to the official body, the duties of which are clearly defined and which is directly responsible, among other things, for the care of the sick and injured of armies. The real strength of the Red Cross lies in the fact that it is essentially civilian. The moment it apes military organization it becomes neither civilian nor military; it relinquishes the strength of its position as representing the people and loses the respect of the forces which would wholeheartedly welcome its aid but would equally resent any assumption of authority. Let us hope that the *Army and Navy Journal* has been misinformed and that the War Department not only does not propose "to authorize the use of military titles, rank, and uniform by representatives of the American Red Cross," but that it will positively forbid and prohibit any such thing.

TUBERCULOSIS IN THE SOLDIER.

It has been believed that the greatest mortality and morbidity in warfare were the results of diseases not actually incident thereto rather than from the violence accompanying it. It is true that wars have been characterized by epidemics—smallpox, cholera, dysentery, typhoid, etc., but these epidemics have taken greatest toll, not from the soldiers themselves, but from the civilian population among whom they were billeted or to whom they returned. War destroyed the strong in battle, but Nature equalized conditions by destroying the weak at home through epidemics. Total war casualties seem very high because the public is wont to consider war morbidity as entirely a wound morbidity, whereas on reflection it can be seen that the soldier has the same predisposition to disease in the field that he has at home. If the general morbidity is subtracted from the total war morbidity the figures for the war will be comparatively low. This applies even to violence, for the number of deaths from violence of all kinds, including industrial violence, is very high in civil life.

Recently the question of tuberculosis among the soldiers has attracted much attention, especially because of the large numbers reported among French troops. An analysis of the figures discloses the fact that not more than about two per cent. of the military population is thus affected, a number no larger than in civil life. The number of victims seems appalling principally because they are all segregated at once for treatment among a people in whom the campaign for the prevention of tuberculosis has not been developed to such a degree as among other belligerents. Nevertheless, it has been urged that examining surgeons take particular pains to exclude from our own draft those who seem susceptible to tuberculosis or who are likely to be sources of infection of soldiers with whom they must be closely associated. It would seem that the hardships and overcrowding incident to a military campaign have a greater tendency to bring out tuberculous disease than similar conditions in civil life, yet the attempt to weed out the unfit in recruiting and the special attention to matters of general health and sanitation render the likelihood of initial infection or increased susceptibility much less. On the contrary, it has frequently been stated that nonactive or arrested tuberculous individuals were benefited rather than harmed by the life and discipline of the soldier. This, of course, is open to question. The arrested case as such is an arrest only on sufferance, and may become reactivated under adverse conditions. To allow suspects or men with an arrested condition to mingle freely among nontuberculous soldiers without the surveillance that they would get in civil life would be to court danger, and to advocate it would be to deny the whole principle of tuberculosis prevention. Aside from the question of infection of others, there are great difficulties and much expense involved in taking care of the sick soldier as well as the burden of pensions. This alone should make it expedient to reject every suspect. It is readily understood that where the man power is limited discrimination cannot be so fine as where it is abundant. Discrimination, however, should be exercised rather in respect to the rejection of disease suspects than of the physically defective. While it is true that most cases of tuberculosis are not clinically positive and that many with positive diagnoses who have re-

ceived sanatorium treatment are not tuberculous, it is equally true that many unsuspected cases with mild symptoms referable to the respiratory tract are in fact tuberculous. These persons get well under favorable conditions, but it is doubtful whether the hardships incident to military life would act otherwise than unfavorably. That every suspect cannot be excluded from service is evident from the fact, according to Koch, that every human being has suffered from tuberculous infection at one time or another. Many individuals dying from other causes in whom tuberculous infection had never been suspected, show evidences of healed tuberculous lesions. In the final analysis it is not the question of accepting or rejecting the suspect or the phthisically inclined individual, whether from history, physical condition, or previous infections, but rather the difficulty of diagnosis of the vast number of the tuberculous who present no symptoms during the incipient stages, but who are bound to light up under the new and adverse environment of military life. The problem can only be solved by calling in every diagnostic aid and by making the medical examination of recruits as important as it really deserves to be.

AUSTRIAN MEDICAL EFFICIENCY.

The observation has been made that the United States entered the war at a time when the other nations, after experimenting and blundering, had at last reduced chaos to order and had learned efficient methods; consequently all this country had to do was to pick up its instructions ready made and follow them. There is perhaps much truth in this, and the fact that it is alluded to with somewhat of a sneer by certain foreigners of Teutonic propensities does not deter us in the least from taking advantage of it. Thus if the contending forces have developed any new wrinkles in preventive or military medicine we do not hesitate to use them for the benefit of our soldiers simply because we have not paid for them with our own blood.

It is particularly gratifying when from our enemies' camp we are able to extract information which is of benefit to our troops. Thus Major Joseph H. Ford, writing in the *Military Surgeon* for June, tells us of the highly efficient sanitary service of the Austro-Hungarian army. As might be expected, system is the keynote. Field hospitals, he found, were not attached to divisions, but were under the control of the chief surgeons of the various armies. Although there are about three to a division, each accommodates 200 patients, but is expansible to 300. The staff is under the command of a senior surgeon and consists of three surgeons, one chaplain, one quartermaster, one pharmacist, one officer, and about sixty men of the army medical corps. The medical units assigned to divisions are of four kinds, depending on the kind of troops. Thus there are those, 1, with an infantry division; 2, with a cavalry division; 3, with an infantry brigade; and, 4, with an infantry brigade equipped for mountain warfare. The unit for the infantry division may be taken as an example; it has the following personnel: six mounted surgeons, two commissioned officers, about 125 noncommissioned officers, and men of the army medical corps, including two artificers and six cooks. The unit is under the command of the senior medical officer. The train consists of seventy-seven men, 149 horses, and forty vehicles, among them fifteen four horse ambulances.

The Austrian army uses four kinds of litters: a demountable, light litter which can be easily disassembled; a litter for use in hospital trains; a litter which is like a canvas chair with side bars and handles, and a litter resembling a hammock. Major Ford notes that "litters were supplied in such abundance—more than the quantity called for by regulations—that extemporized litters were not often seen except after severe engagements." Surely this is worthy of emulation. The Austrian diagnosis tags are made of heavy oiled paper four inches by two and a half inches, with a metal eyelet through which a stout loop of black thread is passed; they are of two kinds, red for slightly wounded cases and white for severely wounded ones. The first aid dressing packet carried by all officers and enlisted men is two and a half by two and a half inches by three fourths of an inch. It contains two compresses, each formed of a layer of five grams of absorbent cotton between five layers of gauze and a gauze bandage two and a half inches wide and four and a half yards long and a safety pin. One of the compresses is free and the other one sewn to the bandage. The packet is covered with cellulose paper sealed with collodion, then with a waterproof cloth, and then tied with tape fastened by a lead seal. The contents are sterilized. The convalescent camps are really buildings supported by public spirited individuals who supplied all things necessary, often caring for the soldiers in their own homes or buildings on their grounds, while the local doctor makes gratuitous calls.

This is of course but a sketch of some of the features of Austro-Hungarian military medicine. Major Ford gives many other details in his interesting article accompanied by a number of pictures and diagrams. The article as a whole is well worth reading by the American military surgeon of today or the one of tomorrow, who is the general practitioner of today.

Obituary

BROOKS HUGHES WELLS, M. D.,

of New York.

Dr. Brooks Hughes Wells, of 523 Madison Avenue, died on Friday, July 6th, as the result of injuries sustained in a collision with an automobile. The accident occurred as he was bicycling on a road near Southport, Conn., where he has a summer home. Doctor Wells was fifty-seven years old and was graduated from the College of Physicians and surgeons with the class of 1885. He was an emeritus professor of gynecology at the Polyclinic Hospital, associate visiting surgeon at the Woman's Hospital, consulting physician at the Beth Israel Hospital of this city and the Brattleboro Hospital, Brattleboro, Vt., and was an editor of the *American Journal of Obstetrics and Diseases of Women and Children* since 1892. He was vice-president of the American Gynecological Association, a fellow of the American Gynecological Society, and a former president of the County Medical Society. He was recently appointed a captain in the Medical Officers' Reserve Corps and last week was on duty at the Academy of Medicine examining candidates for the medical and dental departments of the new army.

News Items

The University of Chicago Medical School.—Plans have been filed for the new $5,500,000 medical school of the University of Chicago, which provide for two buildings, one on the Midway and the other in the West Side medical district.

The Health of the Army.—Surgeon General Gorgas reports that during the week ending July 7th the health of the army continued excellent. The hospital list was slightly larger than during the previous week, but there had been no unusual outbreaks of disease or casualties.

Alienists and Neurologists of America.—The sixth annual meeting of this organization was held in Chicago, July 10th, 11th, and 12th, under the auspices of the Chicago Medical Society, Dr. George A. Zeller, formerly alienist to the Illinois Board of Administration, presiding.

French Order Praises Stanford Hospital Unit.—The entire ambulance section of the American Field Service sent to France by Leland Stanford University last February is cited by General Mangin in orders to the division. The citation of the section is made for its "having given constantly since its arrival at the front an example of courage and profound devotion, especially at Verdun and at Moronvilliers, in pushing up to the battle lines under bombardment to carry away the wounded."

A Training School for War Cripples.—The building at the corner of Fourth Avenue and Twenty-third Street, New York, formerly the home of the College of Physicians and Surgeons, is being transformed, along European and Canadian lines, into a training school ready to receive disabled soldiers and sailors and teach them trades which will make them selfsupporting. The school has been organized under the war council of the American Red Cross and is temporarily under the direction of Mr. Edward T. Devine, head of the New York School of Philanthropy. It has been endowed by an initial donation of $50,000 and the use of the building by Mr. Jeremiah Milbank. A staff of experienced educators is being selected, and Mr. Homer Folks has gone to France to report upon the educational and industrial work being done for war cripples there.

Boston City Hospital Ward Buildings to Be Reconstructed.—The Boston City Council has appropriated $74,000 for the reconstruction of two ward buildings of the hospital, one of which was recently destroyed by fire. The reconstructed buildings will be given an additional story each, and four new sun parlors, increasing their accommodations for patients by one hundred.

An Electrotherapeutic Unit for Base Hospitals.—The American Electrotherapeutic Association is planning a unit for each base hospital, for the purpose of furnishing facilities and men to carry out in a thoroughly scientific manner treatment of the wounded by electrotherapeutic and other physical methods. The equipment should include transformers and diathermic apparatus, x ray apparatus for therapeutic use, the practical forms of static machines, therapeutic lamps, sinusoidal machines, and constant current apparatus. The committee having the matter in charge recommends that such a unit should form a part of every base hospital in this country and abroad.

Women Give Hospital Unit.—The first mobile hospital unit to be offered by the women of the United States to the Government will be that of the New York Infirmary for Women and Children, backed by the National American Woman Suffrage Association. The director of the unit is Dr. Charles S. Finley, with an organization committee composed of Dr. I. von Skolly, Dr. Mary Lee Edward, and Dr. Alice Gregory. An organization office has been opened at 2 East Twenty-third street. The unit will have a force, all women, which may number eighty. It starts with a nucleus of twelve doctors, twenty-one nurses, and three orderlies. In England the National Union of Suffrage Societies has nine hospital units in charge of women, and the American suffragists expect to rival this record.

A Hospital for Soldiers at Lincoln, Mass.—The summer home of Mr. and Mrs. James J. Storrow, at Lincoln, Mass., is to be converted into a hospital for convalescent soldiers, to be called the Lincoln Convalescent Hospital, and as soon as the necessary arrangements can be made it will be turned over to the Massachusetts Medical Women's Hospital Unit, which will have it in charge. The house contains thirty rooms, many with sleeping porches or balconies, numerous bathrooms, and one large room which is especially adapted for use as a ward. In addition to the land and buildings of Storrow Farm, Mr. and Mrs. Storrow are contributing such household furniture and supplies as may be utilized for hospital purposes, the services of many employees, the care of the grounds, overhead expenses, such as heating and lighting, and considerable financial assistance toward hospital equipment. Medical women of Massachusetts will furnish the personnel of the hospital staff, including surgeons, physicians, specialists in all branches, and nurses.

Personal.—Dr. Charles Goodwin Gant has resigned as professor of diseases of the rectum at the Post-Graduate Medical School and Hospital.

Dr. William Allen Pusey was elected president of the Chicago Medical Society, at the annual meeting held on Tuesday, June 19th.

Dr. Leverett Dale Bristol, of Boston, has been appointed State health commissioner of Maine, and will take charge at once of the newly organized health department in that State. During the past ten years Doctor Bristol has been engaged in various phases of public health work in New York, Minnesota, North Dakota, and Massachusetts.

Dr. Augustus Ravoglio, of Cincinnati, has been retired as chief of staff of the dermatological department of the General Hospital, after a continuous service of twenty years. His retirement was made mandatory under the recently enacted law making sixty-six years the age limit for medical officers.

Dr. E. T. Newell, of Chattanooga, was elected president of the Tennessee State Medical Association at the annual meeting held recently in Nashville. Dr. Olin West, of Nashville, was reelected secretary.

Dr. A. G. Howard, of Boston, has been elected president of the Massachusetts Surgical and Gynecological Society, succeeding Dr. J. Emmons Briggs.

Modern Treatment and Preventive Medicine

A Compendium of Therapeutics and Prophylaxis, Original and Adapted

THE USE OF INEXPENSIVE DRUGS IN PRACTICE.

By Louis T. de M. Sajous, B. S., M. D.,
Philadelphia.

(*Continued from page 38.*)

In the preceding issue the inexpensiveness of ammonia and the ammonia yielding preparations as diffusible reflex stimulants was pointed out, and the relative disadvantage of alcohol as a stimulant was emphasized except when employed with the additional purpose in view of dilating the skin vessels. In previous instalments the inexpensiveness of strychnine as a stimulant to vascular tone has similarly been referred to. Ingestion of ammonia water or ammonium carbonate in appropriate dose and dilution proved the least costly method of exciting vascular contraction through irritation of peripheral sensory nerve endings, while hypodermic injection of strychnine was found equally inexpensive as a vascular excitant among those agents which directly stimulate the vasoconstrictor centres after absorption.

Turning to a third group of drugs, those which cause contraction of vessels and rise of blood pressure, not by reflex or central action, but chiefly by direct stimulation of the vessel walls themselves, we note that there exists in this group no drug which corresponds in cheapness to ammonia and strychnine in the two other groups. The outstanding members of the group of the direct vasoconstrictors are epinephrin, or adrenalin, ergot, and pituitary extract. The first of these, while its cost has not risen since the beginning of the war, is about one hundred times as expensive, dose for dose, as the salts of strychnine. As Josué has recently emphasized, results in some respects similar to those obtained by hypodermic injection of epinephrin solution can be secured by oral or hypodermic use of an extract of the whole adrenal gland. As commonly supplied, the adrenal remedy occurs in the form of dried adrenal glands—suprarenalum siccum, U. S. P., required to contain 0.4 to 0.6 per cent. of pure epinephrin. Even this preparation, in the moderate single doses, one and a half to three grains, which Josué recommends is about thirty to sixty times more expensive than strychnine, while admittedly inferior to pure epinephrin in promptness and certainty of action. An adrenal extract suitable for hypodermic injection would, furthermore, be more expensive than the ordinary dried adrenals. Ergot showed a marked rise in price in the early months of the European war. By the close of 1914, however, the scarcity had already been largely overcome and since that time a gradual further decline has occurred, with the present price not more than fifty per cent. higher than that prevailing before the war. If a dose of thirty grains of powdered ergot, one of the least expensive preparations, is used, the drug is about thirty times as expensive, dose for dose, as strychnine. The same relationship to strychnine applies at present if an aqueous extract of ergot, the effects of which on the bloodvessels have been held to be relatively greater than those on the uterus as compared to alcoholic ergot preparations, is employed: though, as a rule, the price of aqueous ergot extract of the Bonjean type has in the past been somewhat higher than that of a corresponding amount of crude ergot.

In the case of certain pituitary preparations, expense is far greater even than with adrenal products or ergot. In the customary dose of sixteen minims 1 c. c. liquid pituitary extract, or as it is now officially termed, liquor hypophysis, is approximately ten times as costly as the ten minim dose of epinephrin solution and correspondingly no less than one thousand times as costly as an injection of strychnine. Dried pituitary substance, made from the organ as a whole, is not much more expensive, weight for weight, than dried adrenal gland; the dried preparation of pituitary best adapted for causing vasoconstriction, however, is not that of the whole gland, but that made from the posterior lobe alone, and the cost of the drug would naturally be correspondingly greater if such preparation were used.

Comparing suprarenal products with ergot we note, in the first place, that epinephrin is about three times as expensive to use as powdered ergot or an aqueous extract of ergot, while dried adrenal gland is about once and a half or twice as expensive as ergot, and the question arises, in view of the less cost of the latter drug, as to how far it can be substituted for adrenal products without prejudice to desired therapeutic effects. On the whole, experience has shown that ergot is, from the standpoint of general vasoconstriction and a general rise in blood pressure, a rather uncertain agent. This is by no means surprising in view of the complexity of the drug as regards active principle and the fact that while some of these principles, especially ergotoxine and tyramine, exert a vasoconstricting action, others in particular histamine or ergamine, tend to lower the blood pressure. While the net result of the conflicting actions is usually in the long run a vasoconstriction, the composition of the drug seems not infrequently so to deviate from the type that no effect on the blood pressure is produced. Again, ergot might be thought advantageous as compared to adrenal preparations in acting more efficiently when given by mouth and more persistently when injected under the skin or intramuscularly. The observation of Josué, however, in cardiovascular exhaustion in overfatigued soldiers, together with the previous reports of Satterthwaite and several other clinicians on the oral use of adrenal preparations, seem to show that almost any desired degree and continuity of action can be obtained with these agents under suitable methods of administration. Thus, Josué reports distinct results from the giving

of one to five c. c. a day of one in 1,000 epinephrin solution divided into equidistant doses, not exceeding 0.5 c.c., each administered in a little water; in some cases, three c. c. a day was kept up for a month or six weeks without any untoward side effects. In giving the remedy hypodermically, he secured a suitable rate of absorption by combining epinephrin with saline hypodermoclysis, one c. c. of epinephrin solution and 0.01 gram of novocaine being mixed with 250 to 500 c. c. of saline solution just before the beginning of the injection. Oral or hypodermic use of whole adrenal products was also, as already mentioned, found effective, especially in cases of general asthenia and nervous or digestive disturbance associated with adrenal insufficiency, whereas pure epinephrin proved more potent in cardiovascular weakness. On the whole, if these observations and those of Hutinel, Netter, and others are confirmed, as seems likely, epinephrin should prove definitely superior to ergot, even by the oral and hypodermic routes, in the certainty of its action on the vessel walls; and the relatively slight difference in cost in favor of ergot will by no means justify substitution of this drug for epinephrin where a general, direct vasoconstricting effect is sought.

(*To be continued.*)

Treatment of Trench Foot.—V. Raymond and J. Parisot (*Paris médical*, March 24, 1917) describe the results reached after successive trials of a large number of remedies. The affection is due to prolonged exposure to cold water, and presents the characteristics of a mycotic infection, sometimes localized in the feet, and, less frequently, involving the whole system. In the simple edematous form, the feet should first be bathed in warm water and the nails carefully cut. The feet should then be gently washed with the following soap:

℞ Saponis mollis, ...1000 grams;
Camphoræ pulveris, ...25 grams;
Sodii boratis pulveris, ...100 grams.—M.

They are then dried and dressed with a layer of absorbent cotton of the thickness of a finger, wrapped in gauze and dipped in the following solution:

℞ Camphoræ, ...1.10 grams;
Sodii boratis, ...15 grams;
Aquæ bulliatæ, ...1000 grams.—S.

This dressing, which should be covered with some impermeable material, should be carried as high as the edema extends, and is to be renewed daily. When the edema disappears, the dressing should be used for a day or two without the impermeable covering, and later, a little camphorated oil merely rubbed over the parts. Blisters larger than a dime or with hemorrhagic contents should be completely excised, the underlying gelatinous mass removed with sterile cotton and aseptic compresses dipped in a solution of three parts of camphor in 100 parts of ether applied, to be renewed daily. Where necrotic areas occur, they should be softened with a dressing of camphor in ether of of colloidal silver and gradually detached from without inward; the camphor in ether dressings should then be continued for a time. In severe forms with the foot purplish in color, incisions, parallel with the long axis of the foot are made in the infiltrated areas, down to the subjacent layer of fetid edema; foci of suppuration, when present, are widely opened. The foot is first dressed with camphor in ether, then with colloidal silver or, especially in suppurating cases with colloidal gold, or with a solution of one part each of eucalyptol, balsam of Peru, guaiacol, gomenol, and camphor, in 100 parts of ether. Cauterization and surgical procedures are to be strictly avoided. When the sloughs have fallen off and the lesions been freed of infection, repair goes on rapidly under dressing of camphor in ether, saline solution, or ambrine. Skin grafting, hot air, etc., can also be resorted to. In septicemic cases subcutaneous injections of camphorated oil or intramuscular injections of colloidal camphor are of value. All patients should receive tetanus antitoxin, to be repeated weekly in the presence of ulceration or extensive necrosis.

Medical Treatment of Chronic Intestinal Stasis.—Max Einhorn (*Medical Record*, May 19, 1917) advises that these patients be told that no harm will result if the bowels do not move for several days at a time, and should be instructed to go to the toilet at the same hour each day and then not to bother about the bowels until the next day. Nerve sedatives are often of help, and the diet should be ample and varied and should include plenty of vegetables, fruits, and salads. Water should be consumed liberally both at meals and between meals, and if these measures are not sufficient, mild laxatives as cascara, rhubarb, or phenolphthalein may be given. Agar-agar, either alone or combined with rhubarb or phenolphthalein, lubricates the bowel contents and stimulates peristalsis, and can be used over long periods, as may also olive oil or liquid petrolatum in tablespoonful doses on arising and retiring. Other measures are saline enemas and enemas of olive oil or water to be retained over night, abdominal exercises, and massage and electricity to the abdomen.

The Surgery of Amputation Stumps.—G. M. Huggins (*Lancet*, April 28, 1917) deals mainly with the problem of the treatment of the stump, usually after an initial amputation, to prepare it for an artificial limb. Where the stump is good at least three months should elapse before any attempt is made to fit an artificial limb, and then only if the stump has been bandaged tightly and massaged daily. Unhealed stumps are usually the result of guillotine amputations and they should be treated by skin extension or subjected to a second operation. When infected stumps finally heal the skin shrinks greatly and when this occurs the time has come for refashioning the stump. In this refashioning the least possible amount of bone should be removed in most cases, for every inch of purchase is valuable. No secondary operation should be done on a stump previously infected until at least two months have elapsed since healing on account of the danger of lighting up the old infection. No stump should ever have an artificial limb fitted to it until x-rays have proved that there is no sequestrum present. If there is one it should be removed. Sinuses are frequently encountered and are commonly due to foreign bodies, sequestra, or most frequently to silk ligatures. In every case the foreign

material must be removed and the sinus allowed to heal or its track be excised. Pain or tenderness in the stump is commonly due to the failure to cut the nerves off short of the site of amputation. When it is encountered all bulbous nerves must be searched for and the bulbous portions removed. The same is true when the pain is due to nerves being caught in the scar tissue. Pain may also be due to sequestra or to the development of bony spurs, which should be removed. In very deep scars infections or eczema is prone to develop; they should be refashioned. In preparing the stump skin alone without muscle should be used to cover the end of the bone which, together with the organized blood clot, will be quite sufficient. The site of each amputation should be chosen with a view to leaving the best form of stump for a given type of artificial member, and particular care should be taken to keep the nearest joint mobile by massage and passive movements. If the joint has become stiff it must be mobilized by the use of suitable apparatus, massage, forcible breaking down of adhesions, or tenotomies and fasciotomies.

Gonorrheal Pyosalpinx.—George S. Whiteside (*Northwest Medicine*, May, 1917) agrees with the general opinion that during the acute stage operation is not indicated and is in fact dangerous to the life of the patient. Operation is usually performed during the subacute stage and includes the ablation of the tubes, partial or total excision of damaged ovaries and curettage of the uterus, if required. Such an operation is well enough, but it does not go far enough for the gonorrheal infection comes from below and the patient will not be cured without complete eradication of the infection from the cervical glands, Bartholin's glands, and possibly the urethra. Therefore, following the operative treatment every patient should be subjected to a thorough course of local treatments for the cure of all foci of infection. This is perhaps the most important phase of the whole plan of treatment and the one usually overlooked.

Crystalline Ouabain in the Treatment of Cardiac Insufficiency.—Vaquez and Lutembacher (*Bulletin de l'Académie de médicine*, March 20, 1917) believe that the occasional instances of fatal toxic action, which have somewhat discredited intravenous strophanthin medication, arose through the fact that the so called crystalline strophanthins extracted from Strophanthus gratus or Kombé are, for the most part, merely variable mixtures of amorphous and crystalline principles, uncertainty in the therapeutic and toxic efforts resulting. Ouobain, a definite glucoside from Strophanthus gratus, crystallizes perfectly, acts with great uniformity, and is no more toxic than amorphous strophanthin. The authors have used it nearly two thousand times without a single death or serious disturbance. As an emergency drug ouabain is particularly adapted for cases of acute distention of the left heart, with angina pectoris and acute edema of the lungs—circumstances under which digitalis is wholly inactive. The ouabain acts still better in these cases if preceded by free blood letting. Intravenous use is alone efficacious, the active dose being 0.5 milligram, dissolved in one c. c. of distilled water. It is well to begin, however, with a dose of 0.25 milligram to test the patient's susceptibility, followed in twenty-four hours by 0.5 milligram, to be repeated for three or four days. Larger doses may cause nausea or even vomiting. The same method of administration is effective in insufficiency of the right heart uninfluenced by digitalis. Often marked diuresis and complete absorption of edema follows. If this effect is not complete digitalis will then prove permanently effective if resumed. Digtalis efficiency may even be restored where the ouabain has seemed without effect. This the authors ascribe to a qualitative difference in the action of the two drugs, the ouabain acting more sharply and exclusively on the heart muscle itself than digitalis.

Severe Infected Injuries of Shoulder and Elbow.—R. H. Jocelyn Swan (*Lancet*, April 7, 1917, urges the immediate resection of the damaged ends of the bones in such infected injuries of the joints, followed by lavage with very hot sterile water and the insertion of Dakin's tubes for the use of his solution. The incision should be left freely open and the part put at rest on a suitable splint. This plan of treatment does not increase the risk of general spread of the infection and greatly enhances the chance of securing a useful new joint. In fact the sepsis is promptly controlled. The earlier the operation is performed after the injury the better are the results and the better the chances of securing sufficient mobility in the new joint. The prophylactic injection of a polyvalent streptococcus and proteus vaccine should be practised in all cases. The results of such treatment are reported for fourteen cases.

Massage and Exercise in the Treatment of Flat Foot.—Hugo A. Oldenberg (*Illinois Medical Journal*, May, 1917) is impressed with the importance of exercise in the various forms of flat foot. Congenital cases are treated by rotating manipulations and orthopedic appliance. In traumatic cases usually following Pott's fracture exercises of inward rotation of the foot should be prescribed with flexion of the toes for ten days before putting the full weight of the body on the extremity. Muscle training and manipulation are of great service in paralytic cases especially those following poliomyelitis, the degree of paralysis determining whether any orthopedic appliance should be worn. In rickets constitutional treatment is of even greater importance than the local measures which will be adapted to the existing deformities. Most cases of flat foot are of the so called static form and the difficulty of getting these patients off their feet is a serious one. If it is impossible for the patient to go to bed, he should at least go about on crutches to take the weight of the body off the feet until the soreness passes away. During this time tender areas in the plantar surface of the foot should be manipulated daily by deep massage and the muscle of the calf should also receive careful treatment. As the tenderness disappears exercises are begun as inward rotation of the foot first without and later with resistance and strong flexion of the toes. As the strength increases the patient is told to walk on the outer edge of the foot, rising up on the toes and walk on the toes while maintaining a strong varus position of the foot.

Therapeutic Use of Extract of Corpus Luteum.—H. E. Happel (*Medical Record*, May 19, 1917), after a review of the literature and a rather extensive personal experience, is convinced that corpus luteum should be given in sufficient doses, and over a long period of time to accomplish satisfactory results. It produces no toxic effect except a feeling of fullness in the head or vertigo, and its action is not cumulative. It is the best remedy available for the nervous symptoms of natural menopause, and also of postoperative menopause, as also in the treatment of irregular or scanty menstruation in young women where it relieves the associated neurasthenic symptoms.

Dispensary Treatment of Epilepsy.—L. Grimberg (*Medical Record*, May 19, 1917) thinks that the disadvantages of the bromide treatment so far outweigh its advantages that its use is rarely justified; atropine is occasionally useful when given hypodermically in large doses; and chloral and its derivatives are not appropriate outside of institutions. Luminal or phenylethylbarbituric acid has been used by Grimberg in twenty-one cases with improvement in sixteen. The adult dose given was 0.75 grain twice daily, while in children seven to fifteen years of age the dose was low to begin with and gradually raised to a maximum of one grain daily. There were no gastric disturbances, the mental condition was not affected, and there was no habit formation. The drug seemed most efficacious in the so called idiopathic cases of grand mal, and petit mal was not affected.

Painless Solutions of Zinc Chloride.—P. Carles (*Bulletin de l'Académie de médicine*, March 20, 1917) referring to the severe pain sometimes caused by zinc chloride solutions injected hypodermically in surgical conditions, asserts that this is due to the lack of purity of commercial zinc chloride, even when marked pure. Arsenic and copper are the chief impurities, but in preparing solutions there may also be formed zinc oxychloride. Pouring twenty or thirty grams of water or ten grams of dry zinc chloride yields a clear solution with liberation of heat. This solution remains clear on cooling, but on subsequent addition of 100 c. c. more of cold water, a turbidity forms, due to formation of the oxychloride. If one filters, as do most pharmacists, after dissolving zinc chloride, a blue color due to copper is noted on dropping dilute ammonia over the filter paper, and the fluid becomes turbid in a few hours because it was filtered while still warm. A properly prepared solution, painless when injected, becomes painful if used when the weather has become colder. Again, dilution of a solution with distilled water to prepare, e. g., a five from a ten per cent. solution, causes a slow deposit of oxychloride, which, if examined microsopically, appears as hexagonal, needle like, or broken crystals or spiny masses, naturally irritating on injection. To prepare zinc chloride solutions for hypodermic injection, therefore, one should use a really pure salt and wait several hours, or better over night, until cooling is complete, preferably adding ice to cool the solution, before carefully filtering. The solution should not be subsequently diluted without repetition of the cooling and filtration.

Tic Douloureux.—G. Wilse Robinson (*Medical Herald*, May, 1917) says that some form of operative procedure is required for the relief of this distressing condition. Among those that have been advised and practised are neurotomy, neurexaresis, removal of the Gasserian ganglion and the injection of neurolytic substances. The first method is not very successful, for the cut ends of the nerve soon unite and the old conditions return. The same is true of the second method. The removal of the Gasserian ganglion is a very formidable operation and it can be done by only a few surgeons. The method which is at once readily applicable and which gives very good results is the last—neurolytic injections. For this purpose the best substance is eighty per cent. alcohol and the most satisfactory technic is that decribed by Wilfred Harris. With this technic, mastered by some practice, it is possible to inject each of the branches of the trifacial nerve and even to destroy the cells of the second and third divisions in the ganglion by injection through the foramen ovale. All of the injections should be done with the aid of local anesthesia only and the extent of nerve destruction should be controlled during the course of the injections by tests of the changes in sensibility. For local anesthesia in this operation a five per cent. solution of novocaine seems to be the most satisfactory.

Observations on Salpingitis.—Paul Rockey (*Northwest Medicine*, May, 1917) believes that in many cases of acute salpingitis recovery without surgical treatment is probable, while in others the condition will become chronic under medical treatment. These two groups constitute about ninety-five per cent. of all cases of the acute form of the disease. The small remainder will either stop in the acute stage or will become progressively worse in the acute stage. Every patient should be given the chance to recover or to pass into a chronic form by being put to rest in bed with the head elevated about six inches; given an ice bag on the lower abdomen; not permitted to take douches; given water only at first and later other fluids: and finally, allowed to make no violent effort to move the bowels. When the fever has subsided the ice bag may well be replaced by a hot water bag, the patient still kept in bed, hot low pressure, saline vaginal douches given and a light diet allowed. Incomplete, infected abortion should be followed by prompt emptying of the uterus and an abscess of the posterior cul de sac should be properly drained. If it becomes necessary to operate for the cure of salpingitis, it will usually be best to remove both tubes, but every effort should be made to retain at least an open stump of one of them and to preserve as much of the ovaries as possible. In such cases pregnancy has followed. For cul de sac drainage the method of freeing the adhesions, packing in a single large piece of gauze, closing the abdominal wound, and then doing a posterior colpotomy and pulling down the end of the gauze gives splendid results. When the salpingitis becomes chronic operation may be required for the relief of a variety of symptoms and the operation will differ with the conditions to be relieved.

Brilliant Green as an Epithelial Stimulant.—R. W. Hodgson-Jones (*British Medical Journal,* April 7, 1917) finds from an extensive experience that brilliant green acts as a very efficient stimulant to the growth of epithelium in superficial wounds, as well as being an effective and nonirritating antiseptic. The most satisfactory form for its use is that of an ointment made by dissolving one part of brilliant green in two of alcohol and incorporating the solution in 100 parts of soft petrolatum. The wound is best treated by removal of all crusts and scabs followed by the application of the ointment upon a piece of gauze cut just the size and shape of the denuded surface.

The Flagellate Diarrheas.—Arthur F. Chace and Arthur N. Tasker (*Journal, A. M. A.,* May 26, 1917) point out that in a certain proportion of cases of diarrheas, occurring in those who have spent some time in the tropical regions, such flagellates as the Cercomonas hominis, Trichomonas intestinalis, and Lamblia intestinalis are the causative agents. The usual intestinal antiparasitic drugs seem to be largely without effect on these parasites, but the administration of medicinal methylene blue by mouth and in the form of high enemas seems to cure the majority of cases. The dose for oral administration should be 0.12 grams every three hours, and the enemas should contain the drug in the proportion of one to 500 to one to 200 and should be given once or twice daily.

Thromboangiitis Obliterans.—S. J. Sinkowitz and I. Gottlieb (*Journal A. M. A.,* March 31, 1917) have obtained favorable results in nineteen out of twenty cases of this affection by the use of Bier's passive hyperemia. The hyperemia was applied to the distal portion of the foot, as far as the ankle, by means of a well fitting suction cup. The treatments were given three times weekly. Two of the patients improved sufficiently to return to work, and all became able to walk without difficulty for longer distances than before, some being able to remain on their feet for the greater part of the day. Among the early permanent effects was increased warmth of the toes and foot, which began in every case after five or six treatments. The color improved, pain was relieved, and when present ulcerations healed rapidly.

Traumatic Injuries of the Kidneys.—Frank Walker (*Boston Medical and Surgical Journal,* May 24, 1917) says that only half the danger exists in operating early that obtains later in the history of the injury. When hematuria continues and a hematoma forms in the region of the kidney which seems to be increasing in size and when there are symptoms of concealed hemorrhage, it is far better to operate then under good conditions than to wait until the risk is greatly increased. Even if the hematoma does not appear a hemorrhage may be dissecting up tissues for a considerable distance, and then the evidence of concealed hemorrhage must take the place of evidence of a hematoma. Delay makes the prognosis more grave. Under modern aseptic precautions the danger of an exploratory operation is not great if undertaken before too extensive hemorrhage or septic infection has taken place.

Treatment of Pellagra.—E. M. Perdue (*American Medicine,* March, 1917) advises the drinking of a water of temporary hardness in order to prevent pellagra. This can be done by placing limestone in the bottom of wells. Hypodermically, one c. c. of a ten per cent. solution of neutral sodium citrate may be administered daily for two weeks, then every second day for two or three weeks more. This is sufficient to cure the average case. Liquor calcis, milk of magnesia, and calcium lactate, as well as sodium carbonate, are also indicated. The rest of the treatment should be symptomatic.

Complete Versus Incomplete Hysterectomy.—E. L. King (*New Orleans Medical and Surgical Journal,* June, 1917) believes that complete hysterectomy is indicated, 1, in fibroid cases where the cervix is badly lacerated or infiltrated; 2, in easy fibroid cases with no complications in which the complete operation will add very little to the duration or danger of the procedure; 3, in the severer types of pelvic infection, especially Neisserian, with a badly infected cervix; and 4, in some cases where drainage is desired when the vagina can be left partly or completely open for this purpose. He does not advocate it when the condition of the patient is poor or the local lesion is such that the removal of the cervix would present technical difficulties that would outweigh the advantage to be gained.

A New and Superior Mercurial Germicide.—Jay Frank Schamberg, John A. Kolmer, and George W. Raiziss (*Journal A. M. A.,* May 19, 1917) investigated a large series of new synthetic mercury compounds and found two which had very great germicidal activity. The first was No. 99 in the series, the second No. 105. The former had the advantage of greater solubility, but both were worthy of consideration. The former, stated to be oxymercuryorthonitrophenolate, occurred as an odorless, red, soluble powder which yielded amber colored solutions. It has been given the name "mercurophen" for convenience. Both compounds were found to be at least fifty times more actively antiseptic than the bichloride of mercury. In ascitic fluid mercurophen was 200 times as active as bichloride and No. 105 was fifty times more active. The Rideal-Walker phenol coefficients were 10,000 for both of the new mercurials as compared with 300 for bichloride. Solutions of one to 5,000 and one to 10,000 or both mercurophen and No. 105 sterilized the skin of the hands after one minute's exposure, while one to 5,000 bichloride required over five minutes and one to 10,000 failed to sterilize the hands. Even in one to 40,000 mercurophen sterilized the skin, and one to 80,000 was the most dilute effective solution of No. 105. Analogous results were obtained in tests with the sterilization of rubber tubing and of emulsions of human fecal material. Mercuric chloride was found to have from four to five times as great a precipitating effect upon human serum proteins as mercurophen and in concentrations as high as one to 5,000 it did not tarnish or corrode nickel plated steel in twenty-four hours. Finally, it was proved that mercurophen was less toxic than bichloride when given intravenously to rabbits.

Miscellany from Home and Foreign Journals

Tuberculosis of Tongue.—Strandberg (*Hygiea*, January 31, 1917) reports a rare case in a man of thirty-five years of age, who two years previously had been treated for an apex involvement of the right lung, from which he recovered. The swelling of the tongue was sudden in its outset and increased rapidly, interfering with speech and deglutition. An incision for supposed abscess only aggravated the condition, and the tongue now protruding from the mouth, was indented at the edges and ulcerated on the surface. The pain, salivation, and difficulty in swallowing even liquid food made the patient's life unbearable. The diagnosis lay between abscess, syphilis, neoplasm, and tuberculosis. The first named was excluded on account of the cartilaginous consistence, the bilateral involvement and the absence of fever. Syphilis was ruled out by a negative Wassermann, the absence of the spirochete, and also *ex juvantibus* large doses of potassium iodide having no effect whatever. Excision of a specimen for examination showed the condition to be tuberculous. X ray treatment reduced the volume of the tongue but had no effect on the excoriations. Relief was only obtained by morphine and penciling with strong cocaine solution. In the meantime complications arose in the form of tuberculosis of the testis, epididymis, and prostate, as well as a tuberculous, laryngitis, which hastened the fatal issue.

Perthes's Disease—Osteochondritis Deformans Juvenilis.—Virgil P. Gibney (*Medical Record*, May 12, 1917), in reporting five cases of this condition first described under its present name by Perthes in 1913, discusses the x ray findings as being characteristic. They show in the earlier stages a slight flattening of the femoral head, a little later a lipping of the head over the neck, and still later a flattening of the epiphysis. The symptoms resemble those of hip disease in the early stages, but become different as the case progresses. Reflex spasm is seen in hip disease, but not in Perthes's disease; night cries occur in the former, but not in the latter. Other lesions about the hip to be differentiated are periarthritis, severe sprain, diastasis, osteomyelitis of the shaft of the femur, bursitis, perityphlitic abscess, and monarticular rheumatism.

Clinical Types of Subtertian Malaria.—A. W. Falconer and A. G. Anderson (*Lancet*, April 21, 1917) saw some 3,600 cases of malaria, of which the majority were of the simple types and responded well to treatment with quinine. Among the cases, however, they noted several groups in which the symptoms suggested other diseases, more or less closely. A large number of the cases presented dysenteric symptoms, but differed in not usually showing mucus and blood in the stools, which were frequent, watery, but feculent. Although quinine was promptly curative in the majority of such cases, some resulted fatally. Two patients were seen presenting choleraic symptoms and dying in fifteen hours after admission to hospital. In twelve cases the symptoms strongly suggested acute appendicitis. All of these responded promptly to quinine. A considerable proportion of the fatal cases were of the bilious remittent fever type with jaundice and collapse. They did not respond well to quinine, even when given intravenously. The next most important cause of death was the pernicious fever type with pulmonary symptoms of the bronchopneumonic form. A number of cases seemed to suffer mainly from symptoms of bronchitis and others from those of lobar or lobular pneumonia. Those with the lobar form of pneumonic involvement proved resistant to quinine and usually succumbed. A small group presented predominating cerebral symptoms or symptoms referable to the central nervous system. Two cases showed generalized edema and ascites and three suffered from gangrene of the foot. In the entire series of cases, excluding true complications, the malarial mortality was slightly under 0.5 per cent.

Improved Method for Estimating Sugar in Blood and Urine.—P. J. Cammidge (*Lancet*, April 21, 1917) describes a very simple and rapid method of estimating quantitatively the sugar in the urine by means of a slight modification of Benedict's solution. The same method can be applied to the blood with excellent results after a simple preparation of that fluid by precipitation of the proteins. The blood test has the great advantage of using only 0.2 mil of blood, an amount readily obtained from a prick in the finger. It is therefore possible to make repeated, or even daily, tests of the blood sugar. The test for either blood or urine requires no special apparatus and can be completed in fifteen minutes.

Bacterial Symbiosis in Wound Infections.—S. R. Douglas, A. Fleming, and L. Colebrook (*Lancet*, April 21, 1917) point out the fact that wounds are seldom infected with a single type of organism and usually contain several types. Experiments, conducted under conditions which represented those present in wounds as closely as possible, showed that the proliferation of Bacillus perfringes or Bacillus Hibler IX was greatly increased when grown in symbiosis with streptococcus, Staphylococcus, diphtheroid bacilli, Bacillus proteus, Bacillus pyocyaneus or a coliform organism. This increased multiplication was not due to neutralization of the medium or to the loss of the antitryptic power of the serum of the medium. The symbiotic growth of Bacillus perfringens with either streptococci or staphylococci also led to a great increase in the multiplication of these two organisms, while the symbiosis of streptococci and diphtheroid bacilli led to increased multiplication of the former and decreased multiplication of the latter. The experiments indicated that bacterial symbiosis was an important factor in wound infections—in fact the most important so far discovered. It would explain the development of gas gangrene in lightly infected cases, in those in which after the opening and cleansing of the wounds the drainage becomes defective, and the almost explosive onset of gas gangrene in some heavily infected wounds.

Physiology and Pathology of Bright's Disease.—L. J. Facio (*La Semana medica,* April 19, 1917) from extensive investigation has decided that so called latent nephritis usually has signs which can be demonstrated on careful examination and which yield to appropriate treatment. In such cases the lesions are localized in the convoluted tubules and classifications are now made according to function instead of histology as first done by Widal. The equilibrium of the albumin in the circulation depends on the integrity of the liver. Hypertension and increased albumin in the circulation characterize the vascular uremias. The diagnosis, prognosis, and treatment of chronic nephritis depend on the study of renal function.

The Control of Heart Disease.—Henry Sewall (*Journal A. M. A.,* June 2, 1917) draws a close analogy between the prevalence of latent disease of the heart and latent tuberculosis and contends that a large proportion of adults have some dormant infection of the heart which may give no definite evidences of its presence, but which can be lighted up by undue strain thrown on the organ through fatigue or intercurrent disease. The presence of such latent cardiac infection can often be recognized or suspected as the result of functional tests of the heart's capacity. Among these the most satisfactory are the graduated exercise tests, the blood pressure tests with rapid alteration of position, and the determination of the character of the cardiac sounds. The initial infection is believed to take place in childhood usually, just as is now the belief with regard to tuberculosis. In the presence of signs of such an impairment of the heart's capacity further damage can be largely prevented by regulation of the patient's activities to meet the conditions. When a break in compensation is threatened, or has occurred, the one most important factor in treatment is absolute physical and mental rest.

Industrial Poisons in Manufacture of Explosives.—Alice Hamilton (*Journal A. M. A.,* May 19, 1917) presents an extensive review of her findings in an investigation of this new and important problem. She visited forty-one plants in which there were about 30,000 workers and was able to obtain evidence of about 2,500 cases of industrial poisoning of greater or less degree of severity. Among the poisons to which munitions workers are exposed are nitrogen oxide fumes, trinitrotoluene, benzene, nitrobenzene and toluene, ether, phenol, mixed acids, sulphuric acid, picric acid, anilin, fulminate, ammonia, mercury, nitronaphthalenes, and chlorine. Only a small proportion of these are likely to cause very serious or fatal intoxication, the most important of which being the first two in the list. In a total of 2,508 cases of poisoning there were fifty-three fatalities, of which forty-eight were due to the first three named substances The symptoms in each form of poisoning are described and attention is called to the fact that few even of the factory physicians have come to recognize the causes of illness among their workers as being largely due to the various forms of intoxication. The field of study of these industrial intoxications is quite new and would well repay cultivation by research and careful clinical study.

Tetany and the Functions of the Parathyroids.—D. Noel Paton, Leonard Findlay, and others (*British Medical Journal,* May 5, 1917) record the results of an extensive investigation of the cause of tetany and of the parathyroid functions. They showed that the symptoms of the disease were due to an alteration in the nerve cells in the spinal cord —chiefly those of the anterior horns. Some action on the myoneural endings was accountable for the increased excitability to electrical and other stimulation. The similarity of the symptomatology of idiopathic and postoperative tetany in man and tetania parathyreopriva and guanidin poisoning in animals showed them all to be of the same nature. Experiments and blood analyses showed that the first three of these conditions were due to the development in the body of guanidin from some disturbance in the functions of the parathyroids which control guanidin metabolism. The course of guanidin metabolism and the precise source of this substance in tetany remain to be worked out, and the solution of these two problems should open the way for rational therapy of all forms of true tetany.

Persistence of Concussion Phenomena in the Wounded Subjected to Intracranial Operation.—Léon Mac Auliffe and Armand Carel (*Bulletin de l'Académie de médicine,* May 1, 1917) state that in a large series of trephined subjects, the symptoms noted in the ten per cent. of cases in which the dura had been opened differed in no way from those in the larger number in which the dura had not been incised. The average interval between the injury and the time of examination in the series was eight months. All the subjects showed persisting concussion manifestations. In addition to the well known subjective sequelæ, e. g., headache, dizziness, mental torpor, irritability, insomnia, nightmares, impaired memory, vasomotor disturbances, and various objective phenomena depending upon the precise situation of the injury, there were noted, as especially prominent features, disturbances of the circulation, sexual function, vision, and audition. Tachycardia varying from eighty-six to 140 beats a minute was noted in seventy-two per cent. of the cases, bradycardia in sixteen per cent., and a normal rate in twelve per cent. As Léri had already pointed out, the rate is generally unstable, especially in the cases with the most marked tachycardia. The latter was always more pronounced in the standing position than in dorsal decubitus. The heart sounds were often muffled and arrhythmia was frequent. The time elapsed since the injury had little relation to the tachycardia, which might be noted as well twenty months as three months after it. In all but one case there was diminished sexual activity, attaining complete impotence in thirty per cent. of all the cases. Irrespective of the situation of the injury, narrowing of the visual fields was noted in fifty-six per cent. of the cases and diminished visual acuity in sixty-four per cent., bilaterally in sixty-two per cent. In forty-eight per cent. impairment of hearing, spontaneous or induced nystagmus, or impairment of equilibrium was noted. Practically any subject wounded in the head and subjected to trephining must be considered as being in a state of concussion for at least two years.

THE AMERICAN MEDICAL ASSOCIATION

Sixty-Eighth Annual Meeting

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SECTION IN PATHOLOGY AND PHYSIOLOGY.

June 7, 1917.

The Relation between Bile and Phenol Production in the Intestine.—Dr. HARRY DUBIN, of Philadelphia, illustrated his paper by two charts showing the phenol output in a normal dog kept on a standard diet containing one gram of nitrogen per kilo of body weight, and in a dog in which a gall-bladder fistula had been produced. It was established that in the absence of bile from the intestine, large amounts of phenol were produced. This increase was unaccompanied by an increase in the conjugation. The unchanged conjugation might be due either to impaired liver function, or to a gradual slow production of phenol, or to a combination of these. The increased phenol production in the absence of bile from the intestine was probably due to the increased decomposition of the intestinal contents brought about by the lack of "digestive activity" and the diminished inhibition of bacterial fermentative secretions. In a previous report it was suggested that the results of analysis of the urine for both free and conjugated phenols might be a valuable index of intestinal putrefaction. The results here reported pointed to a method of differentiating the factor of biliary obstruction.

Dr. I. O. POLESKI made one criticism, namely, that an artificial fistula was a surgical condition, and not one which existed in the normal healthy state. He suggested that the duodenal tube be used for the examination of duodenal contents in this study, as it could be easily introduced into the patient, and specimens of duodenal contents containing bile could be removed at suitable times. He thought this would give an accurate idea of the function of the liver, as far as this particular problem was concerned, without producing a surgical condition.

Doctor DUBIN replied that as far as the surgical condition was concerned, the dogs were not used for the work until sufficient time had elapsed after the operation to render this factor negligible. Concerning the duodenal contents, they had decided to study urine, as it was questionable whether an examination of duodenal contents would yield any valuable data.

A Comparison between the Chemical Findings in Blood and Spinal Fluids.—Dr. R. B. H. GRADWOHL, of St. Louis, Mo., discussed the question of the estimation of urea nitrogen, uric acid, creatinine, and sugar in blood and spinal fluid in a series of twenty-nine cases, mostly cases of tabes, which were under the Swift-Ellis treatment. He showed by the literature that the quantity of urea in all the body tissues is the same, but that there was a difference in the amount of sugar in the spinal fluid and in the blood. He was able to confirm the observation that the amount of urea in blood and spinal fluid was practically the same. In syphilis of the nervous system he showed that the amount of uric acid in spinal fluid was only one tenth of that in blood and in other tests it was about one half. He also showed that the amount of sugar was diminished in the spinal fluid and practically absent in tuberculous meningitis; the latter fact had of course been repeatedly shown.

Doctor LEOPOLD, of New York, said that he had been working on this problem for the last two years, and that his figures were nearly the same as those reported by Doctor Gradwohl, but in spite of these figures and the reports of other investigators, he had found that in children the urea in the spinal fluid did not correspond to the urea in the blood. Myers and Fine had obtained results similar to his, that is, that the urea in the spinal fluid was somewhat reduced. It had not been definitely decided whether the reducing substance in the spinal fluid was sugar. In tuberculous meningitis the sugar might or might not be reduced; in some cases it was normal, in others it was reduced, and at times it was absent. As far as the uric acid was concerned, in normal and some pathological states rarely enough was found to give a positive test.

Doctor GRADWOHL said there was a remarkable difference in the blood of children as compared with that of adults.

The Pathological Physiology of the Heart as Revealed by the Polygraph and the Electrocardiograph.—Dr. LOUIS F. BISHOP, of New York, said that he wished to bring before physicians the importance of the McKenzie polygraph and the electrocardiograph. He felt that there was no more remarkable example of the application of physics to medicine than the electrocardiograph. The pathological physiology of the heart, as revealed by the two instruments under discussion, had been divided into seven types of disorders: 1, sinus arrhythmia; 2, heart block; 3, premature contractions; 4, simple paroxysmal tachycardia; 5, auricular flutter; 6, auricular fibrillation; 7, alternation of pulse. He concluded by saying that these seven disorders had been worked out by the use of the two instruments, and they formed the groundwork of our analysis of living pathological hearts.

An Apparatus for the Study of the Dissociation of Oxyhemoglobin.—Dr. W. G. MACCALLUM, of New York, said that the work of Hufner Bohn Bancroft and others has shown the importance of alterations in the chemical nature of the plasma in affecting the power of the hemoglobin to absorb oxygen. The study of this absorption or its reverse, dissociation, has been made by the use of complex apparatus, difficult to manage and giving comparative, rather than absolute results. The apparatus described was a modification of Van Slyke's ap-

paratus for the determination of the combining power of the blood for carbon dioxide. It was altered by being greatly elongated and graduated throughout. There was a narrow, finely graduated tube holding two c. c. above and below the central part which holds forty-eight c. c. The mercury bulb could be raised or lowered to any point the level of which in the glass apparatus could be read off on a scale. Blood was exhausted in the apparatus until no more gas was given off; then a measured amount, usually two c. c., was shaken in the same apparatus with oxygen at a certain low pressure. Oxygen at, say, twenty millimetres pressure was obtained by introducing about one c. c. of oxygen at atmospheric pressure and expanding it to fifty c. c. The exact pressure at which it stood could be read off from the difference in the levels of the two surfaces of mercury. After the blood was saturated the excess of the oxygen was allowed to escape and that which was absorbed set free in the apparatus by the ferricyanide method and its volume read.

The Morphological Appearance of Cancer Clinically Cured by Means of Radium and Röntgen Rays.—Dr. Isaac Levin and Dr. B. Joseph, of New York, presented an analysis of operative statistics demonstrating that in the great majority of cases of carcinoma the disease recurred sooner or later notwithstanding the most radical operative procedures, and a radical cure of the disease was not frequent. Disappearance of the primary tumor or diminution of the size, cessation of clinical symptoms, and prolongation of life might be considered a clinical cure of the disease. Usually, as shown in previous publications of Levin, this clinical cure was accompanied by morphological changes consisting in degeneration and ultimate destruction of the carcinoma cells and formation of dense connective tissue. The present study was based on a series of cases which showed undoubtedly a clinical cure and at the same time no appreciable morphological change in the tumor tissue. However, it was evident that an inhibition of proliferating power took place in the tumor cells. It was probable that the first steps of the action of the rays on every malignant tumor consisted in such an inhibition of the proliferating power or sterilization of the cells. It was therefore imperative to subject to sterilization every tumor before the performance of a surgical operation.

Dr. Henry Schmitz, of Chicago, said that in the study of the pathology of tissues subjected to the rays the question was often asked whether it was not the indirect action which brought about the peculiar influence on the tumor. The direct action of the rays on carcinoma cells varied. It depended entirely on the specific character of each individual cell. The less differentiated cell was the more radiosensitive. It also depended on the age of the cell, blood supply, and character of the stroma.

Dr. James Ewing, of New York, said that in inoperable and advanced cancer it could only be hoped to bring the tumor to a state of suspended activity, and that if only one tenth could be added to the expectation of life in those cases a great deal had been accomplished. The direct and indirect effects of physical agents was a matter about which there was much difference of opinion.

Experimental Lesions in the Cervical Sympathetic Ganglia and Thyroids of Goats.—Dr. Louis B. Wilson, of Rochester, Minn., continued in this paper, previously reported studies on the pathological changes in the cervical sympathetic ganglia in relation to exophthalmic goitre. In the experiments herein reported, the speaker stimulated electrically and by direct injections of bacteria the cervical sympathetic ganglia of goats, and studied the histological changes resulting therefrom in the ganglia and in the thyroids of the animals experimented on. The histological changes in both the ganglia and thyroids were parallel with those found in the corresponding organs of patients in the various stages of exophthalmic goitre.

Dr. S. B. Wolbach, of Boston, said that about two years ago Doctor Cannon had sutured the anterior root of the right phrenic nerve with the right cervical sympathetic strand in a cat. The animals developed all the signs of exophthalmic goitre. He thought the results reported by Doctor Wilson were in a measure similar to Doctor Cannon's.

Doctor Wilson, of Rochester, replied that his work had been suggested by that of Doctor Cannon. It was difficult to compare the thyroid of a goat with that of a cat, but in general, the changes were somewhat the same. He attempted to reproduce Doctor Cannon's experiments in the goat, but because of the difference in size of the animals, from a surgical standpoint he was unable to make the anastomoses in the goat that Doctor Cannon accomplished in the cat.

Occurrence of Tubercle Bacilli in the Breast Milk of Tuberculous Women.—Dr. Frederick Coonley, of New York, said that Dr. Stanley L. Wang and he had been investigating this suspect in a series of twenty-eight tuberculous women. Specimens of milk were obtained twice a week by breast massage under aseptic precautions. The milk was examined within two hours after withdrawal from the breast. A smear was examined for tubercle bacilli, and the rest of the specimen was reduced with weak antiformin solution and the resultant sediment searched for tubercle bacilli, using the Ziehl-Neelsen technic. Specimens from each of the last fifteen women were injected into guineapigs, which were killed after six weeks and examined for tuberculosis. The patients ranged in age from nineteen to forty years, and the types of tuberculosis varied from the chronic indolent fibroid to the rapid fulminating miliary types. One half the patients seemed to show some improvement, while in the hospital; four died within a month after delivery, and the remaining ten showed no improvement. There was no apparent mammary disease in any of the women. There were about 450 microscopical examinations made twice a week in the series. These were all negative, except one, which was positive once, and another specimen from the same woman which was suspicious once. This case was a pulmonary orthopedic one with negative sputum examinations extending over a period of eight months; the patient had tuberculous bones in both wrists progressing well. She had no signs of active pulmo-

nary tuberculosis and insisted on nursing her child regularly for seven months. The child was one and one half years old, and apparently healthy. The specimens were taken during all periods of mammary activity. Colostrum was frequently examined and injected into two guineapigs. Observations were made on two guineapigs which were fed on breast milk from two tuberculous women three times daily for one month, varying from ten to forty c. c. at a feeding. Small amounts of lettuce and bread were also given. At the end of the period both animals had lost weight. Shortly after the diet was stopped the animals were autopsied, and neither showed evidences of tuberculosis. The author concluded that their results were negative with the exception noted, and that their observations were in accord with other investigators, that is, that tubercle bacilli were infrequently found in the breast milk of tuberculous women who had no mammary disease. The possibility of infection from such milk was very slight, but it was perhaps advisable to stop nursing because of other factors.

A Critique of Banti's Disease.—Dr. Eli Moschcowitz, of New York, reported two cases of Banti's disease, in which the spleens showed marked fibrosis with almost complete disappearance of the Malpighian follicles and sclerosis of splenic veins at the hilus. The clinical features of Banti's disease were absence of known etiology, a time of splenomegaly and anemia, a transitional period in which swelling of the liver was prominent, a final period when the liver was small and there was ascites, and death by hemorrhage or anemia. The pathological characteristics were a marked fibrosis of the reticulum, fibrosis of Malpighian follicles, cirrhosis of the liver which did not differ from the Laënnec type, often an endophlebitis and calcification of splenic veins, and no general glandular enlargement. Banti's conception of the pathogenesis of the disease bearing his name was that the splenomegaly had an infectious origin, the splenic enlargement caused a production of a toxin which in turn produced cirrhosis of the liver and changes in the splenic veins, and finally that the anemia was due to the toxemia and to the hemorrhages. Considering the clinical and pathological features of Banti's disease, Doctor Moschcowitz said there was no single feature or group of features which was pathognomonic. Many of the so called cases of Banti's disease did not prove to be so on a close analysis; for example, characteristic cases had been reported when a definite cause, such as syphilis, had been found. The pathological characteristics Banti described were found in other conditions. His theory of the origin of the disease was also unsatisfactory, as it was hard to believe that a toxin could cause splenomegaly which produced a toxin which in turn caused cirrhosis in another organ. Doctor Moschcowitz stated that Banti had not succeeded in differentiating a definite pathological condition from the broad group of splenic anemias. He pointed out the relation of Banti's disease to splenic anemia, Laënnec cirrhosis, pseudoleucemia, and allied conditions. Splenectomy as a cure for Banti's disease was of doubtful value, as some of the cases had been reported entirely too soon, and other cases which had been called cured were probably not true Banti's disease. The conclusion was reached that Banti's disease was entirely a nosological entity with no well defined clinical or pathological characteristics, and that it would be well to substitute the term "Banti's complex" for that which was now in use.

Immunological Studies in Poliomyelitis.—Dr. Edward C. Rosenow, of Rochester, Minn., explained that further studies had shown that it was possible to develop in the horse a serum that had very high specific cross agglutinating power over a streptococcus which he had isolated from cases of human poliomyelitis and from poliomyelitis in monkeys. The blood had the power of neutralizing the virus in the test tube and of protecting monkeys against injections of virulent virus. In the treatment of a series of monkeys that had symptoms when the first injection of serum was given there was a recovery rate of seventy per cent., instead of a death rate of 100 per cent., which was the rule with the severe type of paralysis. Whether the serums would keep he did not know, but that for a certain time it had some effect was seen from the series of experiments here reported, which were all carefully controlled. Its value might be only short in time. Doctor Rosenow felt that these facts were important in bearing out the idea that this form of organism had an etiological relationship to poliomyelitis, but he did not maintain, and never had maintained, that the streptococcus in the large form was the cause of the disease. However, he did feel that these experiments, which had been done in such large numbers, particularly the agglutination experiments, showed that this organism had an etiological significance.

Dr. Morris Cohen, of Philadelphia, said that he had been doing some opsonic experiments with various organisms, among others, Dr. Rosenow's, but mostly the Kolmer organism. Many samples of serum from recovered poliomyelitis patients were tested with the Kolmer organism, and they showed a high opsonic index in nearly every case, which was not shown in normal serum. Rabbits were inoculated with Doctor Rosenow's and Doctor Kolmer's organism. They could not be made sick, though given severe doses. The serum of the rabbits was used for the opsonic tests, and the cells were so full of organisms that they could not be counted.

Dr. Carrol G. Bull, of New York, was much interested, since his results were diametrically opposed to those of Doctor Rosenow. He used streptococci obtained from the tonsils of poliomyelitis patients and from various other sources, nonpoliomyelitic in origin. He was unable to find any difference in the pathological effect. The animals developed abscesses and lesions due to streptococci, but nothing that showed the pathology of poliomyelitis. His results had been absolutely negative in the establishment of any relation between the pleomorphic organism of Rosenow and the poliomyelitis virus.

Doctor Rosenow replied that all his experiments were carefully controlled in every possible way. He pointed out that the conditions under which they were done were somewhat different from Doctor Bull's, and in a study of this kind a slight variation might make considerable difference. It was known

that poliomyelitis was a condition that affected small, young animals, although the older ones were not immune. Doctor Bull used twelve guineapigs weighing from 400 to 500 grams, while the speaker never used a guineapig that weighed as much as 350 grams. Then again Doctor Rosenow's experiments were done in midsummer when the epidemic was at its height, and Doctor Bull's were done in the winter. The conditions of the injection of the virus were different, as was the method of growth of organisms. The question was extremely difficult and little variations in technic might make the difference between positive and negative results.

Ether Therapy in Surgical Infections and Its Effect on Immunity.—Dr. John Saliba, of Elizabeth City, N. C., said that experimentally and clinically ether, whether in its vaporous or liquid state, had been proved to have a bactericidal action. Vincent's typhoid vaccine, which had been used frequently and with excellent results, was sterilized by ether instead of by heat. Ether had never failed to sterilize albuminous culture media. The structure of a bacterium was regarded generally as consisting of protoplasm surrounded by a cell wall. Ether by exerting a solvent power for fat caused an increase in the permeability of the wall and, consequently, a modification in the aggregation of the colloid protoplasm particles. Ether helped the vital resistance in the following ways: 1. It was an agent which increased the outflow of lymph by inducing active hyperemia. In this way it increased the various immune bodies which may be supposed to be present in the exudate—the antitoxins, the antiferments, the bacteriolysins and the bacteriotropins. 2. Ether was a cell proliferant. 3. By its tonic action on the circulatory and nervous systems ether might have a stimulating influence on the hematopoietic organs. 4. Ether, by directly destroying a large proportion of the bacteria and by modifying those that were not killed so as to render them more easily destroyed by the tissues, might lessen the output of aggressins. 5. Leucocytic emigration apparently went on unaffected in the presence of ether. 6. Ether hastened the formation of fibroblasts in the wound and quickened the regeneration of embryonic tissues without clotting the fibrin. 7. When applied to the most delicate surfaces of living tissues, such as the mucous and serous surfaces, ether produced no injurious effects. 8. When absorbed, all evidence showed that if ether had any toxic action on the body tissues it was very slight.

Ether was a valuable therapeutical agent in the following septic and infectious conditions: Septic wounds, abscesses and sinuses, peritoneal infections, pleuritic infections, joint cavity infections.

The Etiology and Pathology of Rocky Mountain Spotted Fever.—Dr. S. B. Wolbach, of Boston, gave a short account of the work previously done in this field. The pathology of the disease had been investigated very little. First in human patients and later in animals a perfectly distinctive type of lesion was demonstrated which affected the bloodvessels in all parts of the body. It was possible therefore to define the disease as one in which the peripheral bloodvessels, involving the arteries and veins of the skin and in male animals the genitalia, were particularly affected. The disease had been produced experimentally in guineapigs and monkeys as it occurred in humans. There was associated with the lesions described a very peculiar minute organism which was always intracellular and in the smooth muscle fibres. The staining reaction of this organism was different from most bacteria. In the tick a very minute form of the organism was found, which might be demonstrated both in smear preparations and in sections. The difficulty of cultivation, the peculiarity of the staining reaction, and the appearance of these two types, which Doctor Wolbach was convinced were species of the same organism, led him to take it out of the class of bacteria. The exact nature of the parasite was not determined, but in spite of the difference of morphology, it seemed more closely related to the spirochetes than to the bacteria. The organism appeared in two forms, a minute one and a larger, lanceolate paired form one quarter the size of the pneumococcus. It was present in the circulating blood in the form observed by Ricketts. A series of feeding experiments were made with the tick which transmitted the disease. These showed the presence of the microorganism characteristic of infective ticks. The organism was present in the salivary glands, acini, and ducts, which showed the mode of transmission of the disease.

Dr. Louis B. Wilson, of Rochester, Minn., said that fourteen years ago Chowning and he began investigations on this disease, studying it from the epidemiological standpoint. It required only a short period of time to show that epidemiologically the disease was transmitted by ticks. Since 1903 some advances had been made in the study, but until Doctor Wolbach began it, every investigator had made some mistakes. The Public Health Service had done excellent work in attempting to eradicate and to prevent the disease. Doctor Wilson felt sure that Doctor Wolbach was on the right track, and from his preparations and pictures he thought he had an organism which was a definite entity, and is not an artefact or granulation.

Doctor Wolbach concluded that he had been able to produce an exact duplication of the disease in animals, which was one of the reasons why he believed the organism was not a bacterium.

Clinical Pathology and Morbid Anatomy of Experimental Trypanosome Anemia.—In the absence of the authors, Dr. E. B. Krumbhaar and Dr. R. M. Pearce, of Philadelphia, this paper was read by title.

Study of the Streptothrix Isolated in Two Cases of Rat Bite Fever.—Dr. William Litterer, of Nashville, Tenn., said that rat bite fever was a rare disease, only eighty-one cases having been recorded in the literature. Schottmüller and Blake each reported a case in which a streptothrix had been cultured from the blood. These two cases and the ones here reported made a total of four in which a streptothrix has been successfully cultivated. The two cases presented by Doctor Litterer gave a typical history of rat bite fever. The two isolated streptothrices were apparently identical, except that the type in the first case persisted in the formation of very long forms, while the other type almost invari-

ably grew in short filaments. Culturally they were nearly identical with the Streptothrix muris ratti reported by Schottmüller and Blake, and they were very like the streptothrix isolated by Tunnicliff from the lungs of white rats with bronchopneumonia. In the second case the streptothrix was isolated from the blood three different times when the fever was at its height and negative cultures were obtained twice in both cases in the afebrile stage. In each case the patient's blood showed a marked increase in opsonins and agglutinins for the two organisms. In the second case it was definitely proved that the organism disappeared from the bloodstream during the afebrile stage and reappeared during the height of the paroxysms. Autogenous vaccine therapy seemed to have cured the two patients. In view of the recent publications of Japanese investigators concerning a spirochete as being the true etiological factor of rat bite fever, Doctor Litterer stated that it was possible that there were more than one cause of the disease.

Anesthesia in the Curriculum and Clinic.—Dr. Willis D. Gatch, of Indianapolis, said that he had seen a questionnaire addressed to the medical schools of the United States by the American Association of Anesthetists, in which it was generally admitted that the medical schools needed better instruction in anesthesia. The discovery of anesthesia made modern surgery possible, but the schools now recognized that the instruction given in anesthesia was not sufficient to make the students safe anesthetists. The curriculum in our medical schools was much too crowded for the introduction of a long special course in anesthesia, but the suggestion was offered that there were other departments in which the teaching of anesthesia might be introduced and emphasized. The subject touched many others, as physiology and surgery, and it could be emphasized by these professors and approached from a number of different angles. There should of course be training in the actual application of an anesthetic under the supervision of a competent man. Now that medical students would in all probability leave the schools and be called upon to do emergency work of all kinds, it was particularly imperative that they should be able to administer an anesthetic safely. The proper sort of anesthetic in a surgical clinic required the judgment and experience of an intelligent and expert anesthetist and one who was interested in his work. Doctor Gatch closed with the plea that the position of anesthetist be made as remunerative and dignified as the importance of the work requires.

Dr. Arthur D. Bevan, of Chicago; Dr. Edward W. Lee, of New York; Dr. S. J. Meltzer, of New York; Dr. A. F. Erdmann, of Brooklyn, and others discussed the place that anesthesia should have in the curriculum. They agreed with Doctor Gatch's suggestions in the main, and discussed the attitude of the interne anesthetist, the trained nurse who gave anesthesia, the need for research along these lines, and for correlating the teachings of the various departments in our medical schools.

Pathological Pulmonary Changes during Endotracheal Anesthesia in Experimental Lung Surgery.—Dr. Conrad Georg, Jr., of Ann Arbor, Mich., said that the chief dangers to life in experimental lung surgery were pneumothorax and infection of the pleura. Pneumothorax might be prevented by the use of an apparatus which would produce an artificial exchange of gases in the lungs during the period of the operation. Meltzer's insufflation apparatus might be regarded as a simple and safe method for inducing anesthesia for experimental lung surgery when the correct adjustment between the pressure required in the endotracheal tube to overcome pneumothorax and the capacity of the delicate lung tissue to withstand it had been secured. The speaker performed a series of pneumectomies on dogs at the surgical laboratory of the University of Michigan in order to determine the pathological changes which might result from this procedure. Dogs were found to be very unfavorable subjects for these operations on account of the shock which resulted from exposure and loss of body temperature, their inability to stand pneumothorax well and their low resistance to infection in the pleural cavity. The mortality in dogs was high when the distemper infection was present. This was true under ordinary ether anesthesia as well as endotracheal insufflation. The pathological changes observed in the lungs of dogs which were afflicted with distemper and were subjected to operations under general ether anesthesia consisted of congestion with areas of bronchitis and pneumonia. Under endotracheal insufflation dilatation of the alveoli was also observed in adition to the changes which followed ordinary ether anesthesia.

Eighteen lung resections were performed in this series of experiments with four recoveries. The difficulty in determining the exact pressure required to overcome the danger of pneumothorax and the susceptibility to infection of animals confined in a laboratory without an outdoor runway made the mortality necessarily high. It was found that endotracheal insufflation was not without harmful results upon the structure and function of the lungs even in dogs which recovered from the operations. The pathological changes consisted of overdistention of some of the alveoli and bronchioles with congestion and edema of the alveolar walls and emphysema of the unoperated lung with areas of atelectasis and subacute purulent inflammation in the operated lung accompanied by a subacute purulent pleuritis. In the presence of infection with the distemper germ general purulent pneumonia and empyema followed operation. The pathological changes in the structure of the lungs found in animals that died consisted of large hemorrhagic areas with tearing of the walls of the alveoli, accompanied by intense congestion and atelectasis. These harmful effects of insufflation followed when the pressure in the endotracheal tube was too high or too low for the safety of the animal under experimentation.

Dr. Willy Meyer, of New York, pointed out the need for great care in the application of endotracheal insufflation anesthesia. The method was undoubtedly right but in many cases its application was wrong. He agreed with Doctor Georg's conclusion that endotracheal insufflation anesthesia

should be limited to intrathoracic operations, but it was also very useful in operations on the brain and in cases where pressure existed on the lower portion of the trachea, due to the presence of tumors.

Dr. Charles H. Peck, of New York, discussed the subject from the clinical standpoint. From a study of a large number of cases, he was convinced that it did not produce postoperative pneumonia. For three years it was used in many types of cases, and as Doctor Meyer and Doctor Meltzer thought it was a safe method when the technic was properly carried out. It did not seem possible that extensive changes could take place in the lungs of human beings without showing bad aftereffects, but in his first series of 216 cases there were only two of postoperative pneumonia, which was less than one per cent., and in those two cases it was not believed that the anesthesia was responsible for the condition. When intrapharyngeal insufflation anesthesia was used pneumonia appeared to be of more frequent occurrence. Endotracheal insufflation anesthesia could be safely used in the two instances cited by Doctor Meyer, and also in operations on the neck, goitre cases, and in some kidney operations. Doctor Peck did not believe that clinically there was any danger of damage to the lung tissues.

Dr. C. A. Elsberg, of New York, said that this method of anesthesia was being used at Mount Sinai Hospital in a variety of conditions, particularly in a selected number of cases of intrathoracic operation where it was used to prevent collapse of the lung: where the giving of anesthesia by the ordinary method would interfere with the operative procedure to some extent, as in cranial operations and tumors of the hypophysis in operations in the upper cavity; in cases where interference with respiration was feared, as in large goitres; and in some cases of acute intestinal obstruction. Very little pulmonary trouble was encountered, and he agreed with the other speakers, that the danger was due to the technic, and not to the method itself.

Dr. Samuel Robinson, of Rochester, Minn., said that Doctor Georg's conclusions did not condemn intratracheal insufflation anesthesia. An interesting point was that when this method was used with dogs with distemper, pathological changes were produced. It was to be hoped that these studies would stimulate researches on the pathological dog, instead of the normal animal. After injuries had been produced, it would then be possible to learn how to treat the diseased lung in animals, and from these studies, in human beings.

Dr. Franz J. A. Torek, of New York, felt that some of the operations performed on the esophagus could hardly be done without this method of anesthesia, and it was nearly as important in brain cases.

Shock during General Anesthesia.—Abstract of this paper by Dr. Frank C. Mann, of Rochester, Minn., appears on page 1157 of the June 16th issue of the Journal.

Dr. Fenton B. Turck, of New York, discussed experiments in shock under anesthesia that he had done with the abdomen open and closed in a large series of animals. Under these two conditions the results differed very widely. The experiments showed, among other things, that there was a loss of antiferments in the blood, that a condition of acidosis was present which was very much relieved by alkaline doses during the experiment, and that the introduction of heat during anesthesia had a remarkably beneficial effect on the circulation of the exposed viscera.

Dr. C. Henry Davis, of Chicago, had performed experiments to determine the toxicity of chloroform, ether, and nitrous oxide in pregnant and nonpregnant animals. Two of four animals given chloroform for six hours died. He showed a number of lantern slides to point out the changes which might occur in connection with these anesthetics.

Artificial Respiration.—This paper, by Dr. George E. Fell, of Chicago, was read by Dr. Albert J. Ochsner. It gave a full review of the literature and of the attempts which had been made to save life by mechanical appliances. The development of the various mechanical methods was described which had been introduced at different times.

Toxic Factors of Some of the Common Anesthetic Substances.—Dr. Evarts A. Graham, of Mason City, Iowa, said that all general anesthetic agents induced a tissue asphyxia and a resultant acidosis. The production of acids was greatest when agents which belonged to the chemical group of alkyl halides were used. Chloroform belonged to this latter class. It was more toxic than ether or nitrous oxide because it yielded hydrochloric acid when it was broken down in the body. The morphological changes in the tissues characteristic of late chloroform poisoning, viz., edema, hemorrhage, central necrosis, and fatty changes in the liver, were probably really hydrochloric acid effects. A brief review of the experimental evidence favored this view. The mechanism of the protective action of glycogen against the production of these changes was discussed. The dissociation of the chloroform molecule in such a manner as to liberate hydrochloric acid left a bivalent carbon residue. This was probably the general type of dissociation of all the common general anesthetic agents.

SECTION IN STOMATOLOGY.

June 7, 1917.

Epithelioma or Cancer of the Oral Cavity.—Dr. L. Duncan Bulkley, of New York, said that the dentist had a great responsibility concerning cancer of the oral cavity, for he of all others was most likely to see the beginning of the disease. An early warning, followed by proper treatment, lessened the prospect of an unfavorable termination. The end results of cancer in this locality were commonly very discouraging. During the year 1914 there were in the registration area of the United States 2,270 deaths from cancer of the oral cavity, or 3.4 persons in 100,000 living; of these 1878, or 82.75 per cent., were in males and 392, or 17.25 per cent., in females. The disease was rare in the young, but after twenty-five years the age of the deaths rose steadily, reaching a maximum of 307 between sixty-five and sixty-nine years of age. Cancer in the mouth had increased more than in any other locality. In 1900 the deaths were 1.6 persons per 100,000, and in 1914 they were 3.4, or more than double, whereas the general mortality had increased only 26.6 per cent.

The principal conditions to be differentiated from cancer were, 1, syphilis; 2, aphthous stomatitis; 3, leucoplakia; 4, simple ulceration, as from dental causes, etc., and, 5, tuberculous lesions. Persistent fissures or abrasions of the lip, which were often precursors of cancer, should be especially warned against. If properly managed they would often yield to medical treatment, even after epithelioma had developed, and only in an early stage was cancer at all amenable to surgery. It was particularly desirable that the dentist should attend most carefully to the condition of the teeth, for rough, broken and decayed teeth played a not inconsiderable part in the production of cancer in the mouth—together with syphilis, and tobacco, and the use of alcohol. However, as these causes were continually operating in millions of persons and relatively few developed cancer, there were other constitutional causes not to be considered by dentists. A caution was given, however, against doing or applying anything which might irritate even a small lesion in the mouth, and the application of nitrate of silver was regarded as almost a criminal procedure. Mild alkaline washes, as of bicarbonate of soda before and after eating, were of much service, as the saliva was often found to be acid in cancer, and the disease was known to develop under conditions of acidity, as in the stomach, large intestine, urinary bladder, etc.

A Composite Osteoplastic Closure of Clefts of the Hard Palate.—Dr. JOHN B. ROBERTS, of Philadelphia, outlined the surgical treatment of clefts of the hard palate as follows: Attack the hard palate and alveolar process at the age of three weeks. Later close the lip with tie beam sutures extraorally. At the age of about one year uranoplasty by the Langenbeck or Lane method should be done. Doctor Roberts discussed the details of each method and the difficulties to be avoided. Tie beam sutures introduced through the cheeks perhaps cause less sepsis in the mouth than plates upon the gums. The Langenbeck flap is best raised with aneurysm needle through a small puncture close to the teeth. Tissue pared from the margins should leave wide contact surfaces and the palatine vessels should be avoided. The soft palate should be detached from the posterior edge of the bone. In the Lane method the flap may include tissues over the alveolus. If the upper lip has been closed too tight it may be widened by a pedunculated flap from the lower lip or V shaped flap may be excised from the lower lip. Tissue pared from the upper lip may be turned into the mouth and retained for later plastic repair. Tension of the palate flaps may be relieved by suturing the pillars of the fauces.

"Soup Bone" Implant for the Correction of Defects of the Skull and Face.—Dr. W. WAYNE BABCOCK, of Philadelphia, pointed out that, while experimental evidence indicated that dead or alien bone introduced into the living tissues was expelled or removed, the experiments had dealt almost exclusively with bone derived from cartilage rather than bone formed in membrane. He presented four clinical experiences showing the usefulness of dead bone in correcting defects of the skull or of the bones of the face. In two cases there were large defects of the cranial vault associated with epilepsy. Portions of scapula taken from the hospital "soup kettle" were perforated with drill holes, contoured, and fitted into the defect, being in contact with the living bone. In both instances after two years there was no evidence of irritation or of absorption of the alien graft, and both patients have been relieved of the epileptic seizures. The bone was boiled on successive days to sterilize it and to free it from animal matter. Portions of mutton and beef bone have been employed. In three other cases portions of boiled bone were implanted under the skin to correct the deformity of saddle nose, a vertical incision being made through a wrinkle line of the forehead, the skin separated from the nasal bones by blunt scissors, and a suitable portion of dead bone slid down into position. In both instances the alien bone seemed to have served about as well as the tibial transplant previously employed by the speaker. It was pointed out that other defects of the bony contour of the face, including the loss of the zygoma, depression or irregularity of the malar or maxillary bones, loss of the orbital ridges, and the like, might also be corrected in this very simple and convenient way. Local anesthesia sufficed for this operation.

Surgical Separation of the Superior Maxillary Bones to Widen the Nares.—Dr. GEORGE V. I. BROWN, of Milwaukee, said that many nervous disorders now recognized as expressions of vagotonia, or tuberculous, otherwise subnormal, and backward children could be benefited by surgical treatment, which was preferable to the slower method of forcing separation of the median palatine suture by the use of appliances alone. He advocated entrance through the intermaxillary suture under the upper lip and expansion of the dental arch with an appliance.

Book Reviews

[We publish full lists of books received, but we acknowledge no obligation to review them all. Nevertheless, so far as space permits, we review those in which we think our readers are likely to be interested.]

Diseases of Children. A Manual for Students and Practitioners. By GEORGE M. TUTTLE, M. D., Clinical Professor of Pediatrics, Washington University Medical School; Consulting Physician, St. Louis Children's Hospital; Attending Physician, St. Luke's Hospital, etc., and PHELPS G. HURFORD, M. D., Pediatrician, St. Louis Lutheran Hospital; Assistant in Pediatrics, Washington University Medical School; Physician to Outpatients; Pediatric Clinic of Washington University, etc. Third Edition. Thoroughly Revised and Enlarged. Illustrated with Forty-seven Engravings and Three Plates. Philadelphia and New York: Lea & Febiger, 1917. Pp. vi-599. (Price $3.50.)

In this volume the authors have apparently attempted to include the entire realm of medicine and have not refrained from including most of the specialties and many surgical conditions. The result is that relatively little space is devoted to any single disease or condition and the treatment of the vast majority of ailments is extremely fragmentary. Thus, for example, only six pages are devoted to summer complaint, a little over four to marasmus, a scant three to acidosis, a scant five to bronchopneumonia, about four to bronchitis, both acute and chronic, two to tuberculous adenitis, five to poliomyelitis, and so forth. As a compend for hasty review of the subject the work is very good, but as a textbook for the proper study of the diseases of infancy and childhood it is wholly inadequate, and as a book of reference it is not to be considered at all.

After Office Hours

In the *Country Gentleman* for June 30th Uncle Joe Cannon says in its leading article, "Learn to eat corn." There is a temptation, of course, to say something about cannon fodder, but we refrain.

* * *

The Sunday Magazine of the New York *Times* seems to have established permanently the excellent habit of devoting a page to some medical topic. The issue for July 1st gives nearly the whole of a page to a discussion of the anticipated shortage of doctors.

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The leading article of the *Survey* for June 30th is a review of *Bulletin 219* of the Bureau of Labor Statistics, prepared by Dr. Alice Hamilton and dealing with industrial poisons in munition plants. Doctor Hamilton is well known as an expert on occupational poisons.

* * *

The *Current Opinion* for July offers a wide range of scientific subjects. Thus there is a brief article on wound infection, a sketch of plant sociology, an allusion to chemistry, a mention of an atomic theory, a word about the ideal foot, and a glance at the recent tendency toward spiritualism.

* * *

Since *Peter Ibbetson* appeared as a play, we have been wondering if it were a complete confession of lack of culture not to have read the book. Of course we have all read *Trilby*. But the rest of Du Maurier! It is somewhat of a relief to see the statement of no less a one than Alan Dale in the July *Ainslee's* to the effect that not only has he never read it, but he is rather proud of the fact.

* * *

Th. Ribot seems to be coming into his own in America only after his death. In France for thirty-five years his name has been as well known as Edison's is in the United States, but outside of the small group of scientific men, it has been comparatively strange to the American public. Now that he is dead sketches of him are beginning to appear; the *American Review of Reviews* for July, for example, gives a short account of his life and works.

* * *

Arnold Bennett, who is always saying something interesting, frequently something clever, and occasionally something startling, says in the *Woman's Home Companion* that a dull man is in partnership with the devil. We have had to talk to dull men at times when we wished they would be suddenly called to a partnership meeting or something of the sort. The three attributes of perfect dullness, says Bennett, are lack of a sense of humor, lack of a play of fancy, and lack of imagination. We might describe them otherwise, thus, a dull man is one who does not appreciate this department, who does not like Barrie, or Lord Dunsany, etc., etc.

Official News

United States Public Health Service:

Official list of changes in the stations and duties of commissioned and other officers of the United States Public Health Service for the seven days ending July 4, 1917:

Akin, C. V., Assistant Surgeon. Relieved from duty at Stapleton, N. Y., and from special temporary duty at Norfolk, Va., and directed to proceed to Chicago, Ill., for duty in the prevention of the interstate spread of disease.

Bahrenburg, L. P. H., Surgeon. Granted one month's leave of absence on account of sickness from July 1, 1917.

Foster, M. H., Surgeon. Granted two days' leave of absence on account of sickness, June 15-16, 1917.

Galloway, T. C., Assistant Surgeon. Relieved from duty on Texas border; directed to report at Philadelphia, Pa., for duty.

Harrison, W. T., Assistant Surgeon. Detached from Coast Guard cutter *McCulloch;* directed to proceed to Angel Island Immigration Station.

Lanza, A. J., Passed Assistant Surgeon. Directed to attend and address a conference of health officers at Kalispell, Mont., July 9-10, 1917.

McBurney, J. W., Sanitary Bacteriologist. Relieved from duty at Washington, D. C., and directed to proceed to Grove City, Pa., for experimental studies for creamery wastes disposal.

Paine, Liston, Assistant Surgeon. Relieved at Philadelphia, Pa., and directed to proceed to San Juan for duty as Chief Quarantine Officer of Porto Rico.

Pierce, C. C., Senior Surgeon. Relieved from duty on Texas border; directed to proceed to Little Rock, Ark., on special temporary duty.

Schereschewsky, J. W., Surgeon. Directed to stop at Charleston, W. Va., en route to Chicago for special temporary duty.

Streeter, H. W., Sanitary Engineer. Directed to proceed to necessary places on watersheds in the Southern States to assist in field service.

Williams, R. C., Assistant Surgeon. Relieved at Okmulgee, Okla., and assigned to duty on mine rescue car No. 2, with station at Raton, N. M.

Worley, J. F., Assistant Surgeon. Relieved from duty at San Francisco, Cal., and assigned to duty on mine rescue car No. 1, with station at Reno, Nevada.

Births, Marriages, and Deaths

Born.

Mazor.—In Philadelphia, Pa., on Sunday, July 1st, to Dr. Samuel Mazor and Mrs. Mazor, a daughter.

Married.

Barker-Lowry.—In Watsontown, Pa., on Tuesday, June 26th, Dr. Olin G. A. Barker, of Johnstown, Pa., and Miss Sara Hoffa Lowry.

Burns-Reinhard.—In Baltimore, Md., on Wednesday, June 27th, Dr. William L. Burns, of Cumberland, Md., and Miss Anita Reinhard.

Hall-Murray.—In Chicago, Ill., on Thursday, June 21st, Dr. Frank W. Hall, of Centralia, Ill., and Miss Fronie Murray, of Beloit, Wis.

McGann-Fay.—In Nahant, Mass., on Saturday, June 30th, Dr. Pierce P. McGann, of Somerville, Mass., and Miss Elizabeth Bowditch Fay, of Boston, Mass.

Peters-Lenhardt.—In Norristown, Pa., on Tuesday, June 26th, Dr. Theodore Peters, of Walden, N. Y., and Miss Gertrude Miriam Lenhardt.

Died.

Beardsley.—In Ottawa, Ohio, on Tuesday, June 26th, Dr. Charles E. Beardsley, aged eighty-three years.

Bedient.—In Little Valley, N. Y., on Saturday, June 23rd, Dr. Seba S. Bedient, aged sixty-two years.

Black.—In Gainesville, Texas, on Friday, June 22d, Dr. Robert C. Black, aged eighty-five years.

Christie.—In Lloyd, Fla., on Saturday, June 23d, Dr. E. Christie.

Dick.—In Sumter, S. C., on Wednesday, June 27th, Dr. Alexander C. Dick, aged fifty-six years.

Felts.—In Bloomington, Ill., on Monday, June 25th, Dr. Thomas O. Felts, aged forty-five years.

Garrey.—In Telluride, Colo., on Friday, June 29th, Dr. John E. Garrey, of Aurora, Ill., aged sixty-nine years.

Haven.—In Brookville, Pa., on Thursday, June 28th, Dr. James A. Haven, aged fifty-one years.

Jones.—In Lynn, Mass, on Tuesday, July 3d, Dr. James A. Jones, aged fifty-three years.

Montgomery.—In Mercer, Pa., on Wednesday, June 27th, Dr. James H. Montgomery, of Erie, Pa., aged fifty-eight years.

Partridge.—In Altonpark, Tenn., on Monday, June 25th, Dr. James Partridge, aged forty-six years.

Turner.—In Brooklyn, N. Y., on Saturday, June 23rd, Dr. Christopher Turner, aged fifty-five years.

Wells.—In Norwalk, Conn., on Friday, July 6th, Dr. Brooks Hughes Wells, of New York, aged fifty-seven years.

Willing.—In Baltimore, Md., on Friday, June 29th, Dr. James E. Willing, aged fifty years.

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Association of Syphilis and Tuberculosis.—For the purpose of determining the frequency with which syphilis is associated with tuberculosis and to direct those found luetic to general dispensaries for treatment of that condition, thereby possibly improving their tuberculous state, Wassermann blood tests were made on 175 tuberculous patients at Corlears Tuberculosis Clinic. The findings are classified as follows: Wassermann tests: cases with four plus reaction, twelve; with three plus reaction, two; with one plus reaction, seven; with negative reaction, 154; total, 175. Fifty-two of the patients had tubercle bacilli in their sputum; of these five gave a strongly positive Wassermann reaction. One hundred and sixteen patients had no tubercle bacilli in their sputum; of these fifteen gave a positive Wassermann reaction, the cases being about equally divided among four plus, three plus, and one plus reactions.

Subsequent clinical findings confirmed the diagnosis of syphilis in all cases that gave a strongly positive Wassermann reaction, and in some of those that were reported weakly positive, the beginning of the luetic affection invariably, so far as could be learned, preceded that of the clinically associated tuberculosis. All of the positive Wassermann cases were referred to general dispensaries for observation of their syphilitic condition and for antisyphilitic treatment. As many with active pulmonary lesions and negative sputum gave a positive Wassermann reaction, with and without clinical evidence of syphilis, the possibility of pulmonary syphilis was not lost sight of, later developments proving, in at least two instances, the probable existence of that condition. The effect of the antisyphilitic treatment upon the tuberculous process in the luetic cases has, thus far, been encouraging. These findings are corroborative of results obtained by other observers, but again emphasize the need of a more general use of the Wassermann test in tuberculous patients.

Decrease in Mortality from Pellagra in 1916.—It is gratifying that the death rate from pellagra dropped very considerably in 1916. In recent years pellagra has very rapidly increased in importance as a cause of death. In 1911, the number of deaths in the experience of a large life insurance company was only 277, in 1915 this number had increased to 650. During this period the rate had increased from 3.6 per 100,000 exposed persons to 6.7. In 1916, the number of deaths dropped to 368, and the rate to 3.6 per 100,000, exactly the same as in 1911. Comparing the year 1915 with 1916, there was a decrease of forty-six per cent. in the rate. This drop is observed in many of the southern districts. In the Atlanta district, for example, the number of deaths fell from fifty in 1915 to twenty-eight in 1916; in the Columbus district, from seventy-three to twenty-nine; in Augusta, from twenty-eight to twelve; in Charlotte, N. C., from twenty-four to twelve; in Greensboro, from eighteen to eight; in Columbia, S. C., from twenty-four to eleven; in Spartanburg, from fifteen to two; in Chattanooga, Tenn., from twenty-one to ten; in Knoxville, from twenty-nine to nineteen; and in Memphis, from fifty-seven to forty-one.

The very remarkable drop in the rate in 1916 appears to bear out the tentative conclusions of the Government experts who are now studying pellagra, namely, that the disease is not of infectious origin, but is probably one of the so called "deficiency" diseases induced by insufficient, poorly balanced dietaries. The year 1914 and the first half of 1915 were periods of depression in the cotton belt and this was reflected by higher pellagra rates. In the latter part of 1915 and in all of 1916 prosperity prevailed and the industrial and agricultural communities of the South enjoyed a more abundant and varied ration. Future observation and experiment by Government authorities will probably definitely determine whether this explanation of the declining death rate of the disease is entirely satisfactory.

It is shown, furthermore, that the disease is much more prevalent among the colored people than among the whites and is much more frequent among females than among males. Thus, in the five year period, 1911-1915, the rate among colored females was highest, 20.3 per 100,000; among the colored males, it was 6.4; among the white females, 4.2, and among white males, the least of all, 1.7 per 100,000. It would be very interesting to learn why females in this country have, approximately, three times the pellagra mortality rate of males. Another interesting fact is that the incidence of the disease increases with age. There is no exception to this fact up to age 65. After 65, the rate remains fairly stationary. Early reports for 1916 which have come from the health authorities of certain of the southern States are in general agreement with the encouraging insurance figures referred to above. There is in effect good indication that the measures instituted by the U. S. Public Health Service and the hypothesis upon which their work has been planned, are sound, and we may confidently expect that this comparatively new scourge will soon be under control.

New Publications Received

Acute Poliomyelitis. By GEORGE DRAPER, M. D., Associate in Medicine, College of Physicians and Surgeons, Columbia University; Associate Attending Physician, Presbyterian Hospital, New York City. With a Foreword by Simon Flexner. With Nineteen Illustrations. Philadelphia: P. Blakiston's Son & Co., 1917. Pp. x-149.

Some Personal Recollections of Dr. Janeway. By JAMES BAYARD CLARK. New York and London: G. P. Putnam's sons, 1917. Pp. vii-36. (Price $1.)

Twenty-second Report of the Board of Health of the Town of Montclair, New Jersey. From January 1, 1916, to December 31, 1916. Lansing, Mich.: Wynkoop-Hallenbeck-Crawford Company, 1917. Pp. 64.

Glaucoma. A Handbook for the General Practitioner. By ROBERT HENRY ELLIOT, M. D., B. S. (Lond.), Sc. D. (Edin.) F. R. C. S. (Eng.), etc.; Lieutenant Colonel I. M. S (Retired); Late Superintendent of the Government Ophthalmic Hospital, Madras; Late Professor of Ophthalmology, Medical College, Madras; and Late Fellow of the University of Madras, etc. New York: Paul B. Hoeber, 1917. Pp. xi-60. (Price $1.50.)

Life Extension. By EDGAR D. BRINKERHOFF. Fall River, Mass.; Pamphlet Publishing Company, 1917. Pp. 26.

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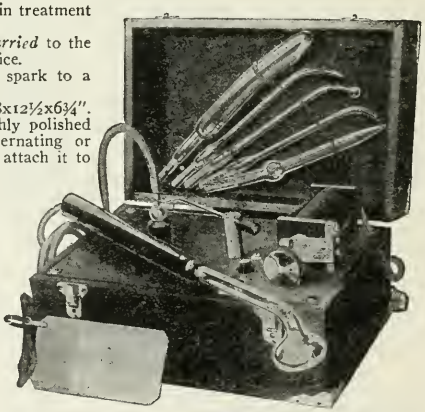

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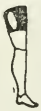

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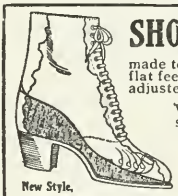

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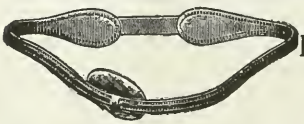

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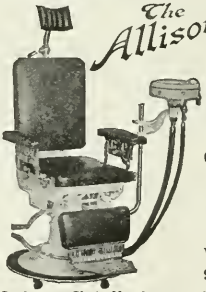

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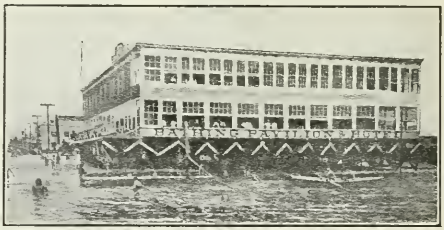

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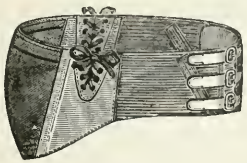

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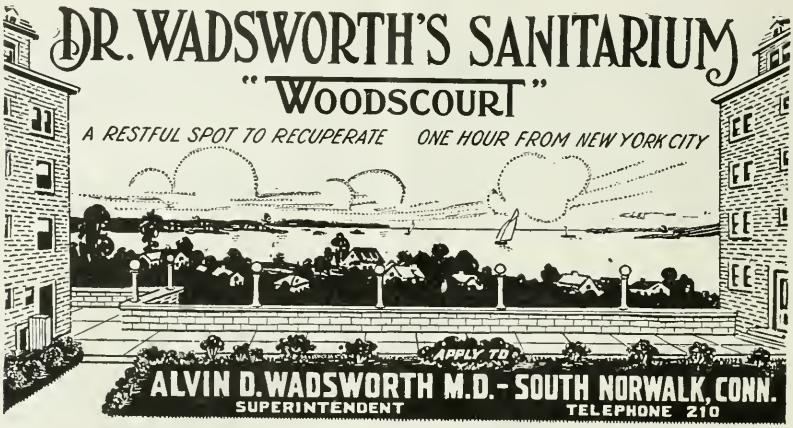

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